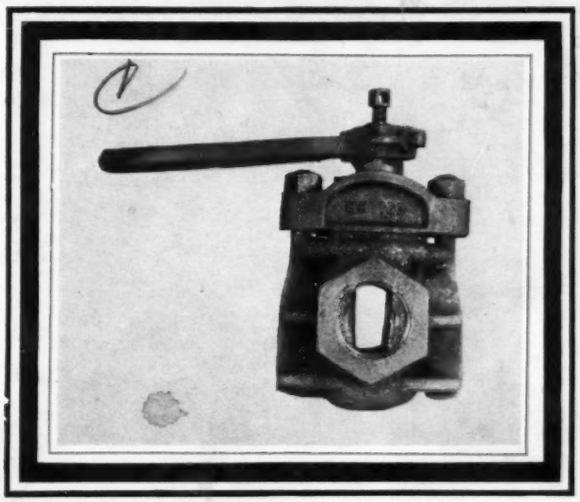
WESTERN GAS

anuary
1930

20 Cents
the Copy

MERCO

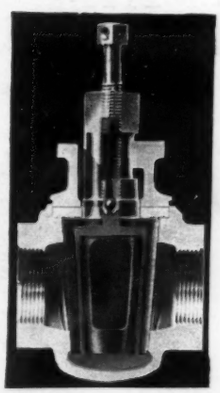


More than 1,000,000 turns

The Nordstrom Valve shown above was opened and closed a million times in the severest of service with no maintenance or repair of any kind. During its service, the valve prevented leaks and was easy to turn, because of the Nordstrom patented lubricating feature—an exclusive advantage of the Nordstrom Valve. Ask for Complete Details.

Special Lubricants

"Merco" Lubricants are compounded of the best materials and are recommended for use in all Nordstrom Valves.



NORDSTROM Valves

Merco Nordstrom Valve Company

SUBSIDIARY OF THE MERRILL COMPANY

Engineers - - - - Manufacturers

Atlanta—Healey Bldg.
Boston—184 Boylston St.
Buffalo—Genesee Bldg.
Chicago—176 W. Adams St.
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Detroit—2842 W. Grand Blvd.
El Paso—111 S. Virginia St.
Houston—Petroleum Bldg.
Los Angeles—556 S. San Pedro St.
New Orleans—Masonic Temple Bldg.
New York—11 W. 42d St.
Pittsburgh—Clark Bldg.
San Francisco—343 Sansome St.

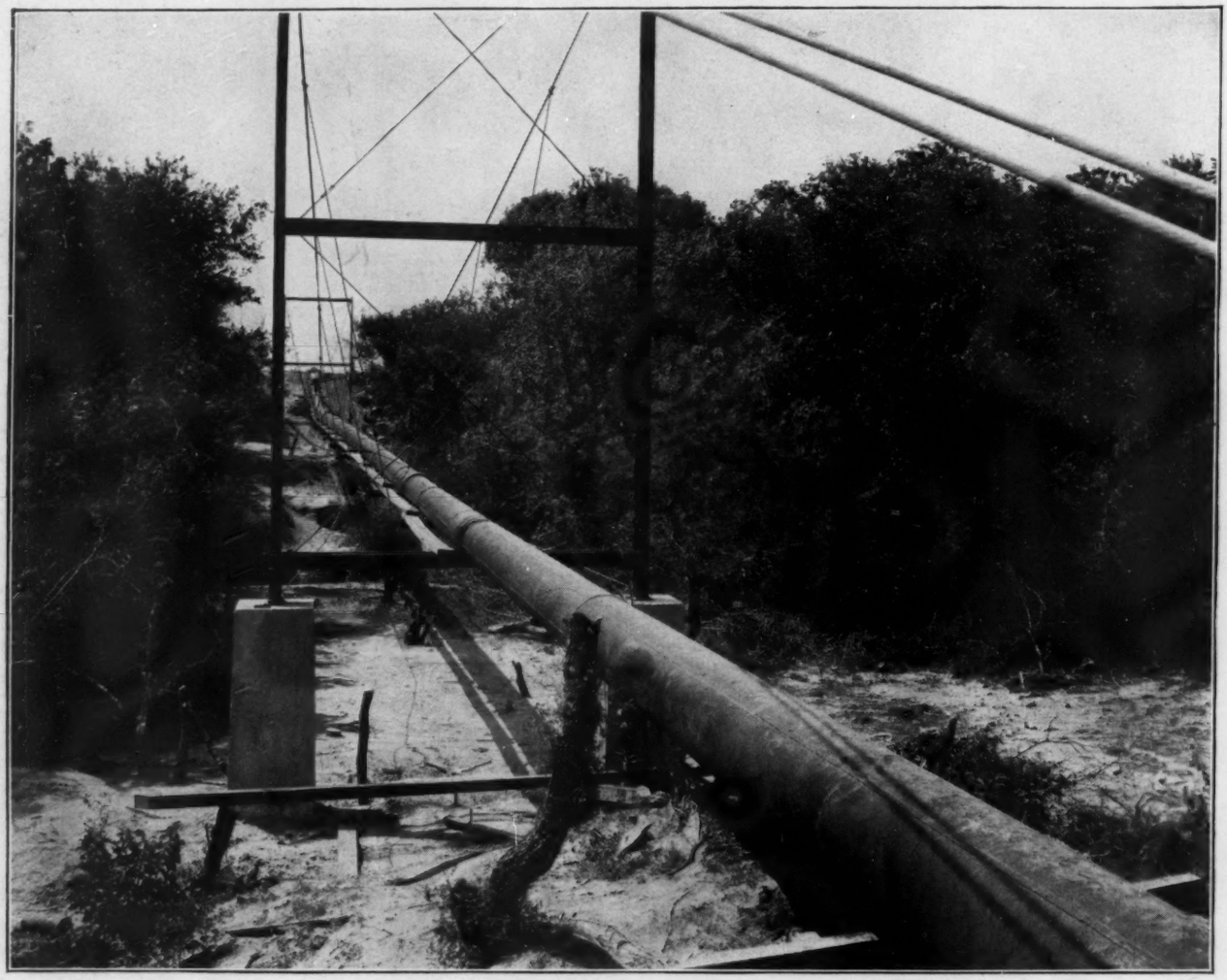
Agencies in Principal Cities

Factories: Oakland, California and Belleville, New Jersey
Canadian Manufacturers — Peacock Bros., Ltd., Montreal, Cobalt, Winnipeg, Vancouver.
England—Audley Engineering Co., Ltd., Newport, Shropshire.
Buenos Aires, Argentine—General Electric, Soc. Anon., Victoria 618 Esq. Peru.

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

TP700
.P3

THE USUAL—THE UNUSUAL



and the extraordinary problems of pipe line construction have yielded more readily to the engineer who had SMITH-Welded Line Pipe and SMITHWeld Bell and Spigot and SMITHWeld Expansion Joints with which to work.

A. O. SMITH CORPORATION ~ *General Offices:* Milwaukee, Wis.
OIL AND GAS FIELD PRODUCTS DIVISION
District Offices: New York • Tulsa • Houston • Los Angeles

SMITH*WELDED* GAS LINE PIPE

10
Pat 12
2950
4932

Fluor has led the industry in cooling tower improvements, always aiming towards higher quality and greater cooling performance.

NOW THE NEW FLUOR TOWER EMBODIES THESE ADDED ADVANTAGES

(1) Greater capacity per square foot,

(2) Improved distribution,

(3) Spray loss reduced to a negligible factor,

(4) An economical size for every service or site.

There are many features which you will be interested in learning about. There is a Fluor representative near you.

Fast Delivery Fast Erection

THE Fluor CORPORATION, LTD.

(Successors to Fluor Construction Co.)

909 E. 59th St., Los Angeles, California

Tulsa, Okla.	New York, N. Y.	Dallas, Texas	Houston, Texas
National Bank of Commerce Bldg.	30 Church Street	Magnolia Bldg.	Second National Bank Bldg.

January, 1930, Volume VI, Number 1. WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.

M.L. 25/IX/36

Maps showing Gas Main Construction. 228 miles of these lines were built during 1929

Gas Main Construction

This year we have constructed 228 miles of gas main as follows:

Clinton Gas Light Co., Clinton, Mass.

2 miles of 6" pipe between Clinton and Sterling, Mass.

Consumers Gas Company, Reading, Pa.

12¼ miles of 8", 4" and 2" pipe between Robesonia and Sinking Springs, Pa. 7 miles of 8", 4" and 2" line between Lyons and Topton, Pa. 6½ miles of 12" line between Mt. Penn and Baumstown, Pa.

Indiana Consumers Gas & By-Products Co., Terre Haute, Ind.

79 miles of 6" pipe and 12 miles of 2" pipe between Paris, Ill., Terre Haute, Greencastle and Martinsville, Ind.

New York Power & Light Corporation, Albany, N. Y.

17½ miles of 6" pipe between Schenectady and Amsterdam, N. Y. 29 miles of 8" pipe between Utica and Syracuse, N. Y. 2 miles of 6" and 4" pipe in Albany, N. Y.

Northern Indiana Public Service Co., Hammond, Ind.

35 miles of 10" pipe between Michigan City and South Bend, Ind.

Philadelphia Suburban-Counties Gas & Electric Co., Phila., Pa.

6¼ miles of 6" pipe between Langhorne and Bristol, Pa. 2 miles of 20" pipe at Conshohocken, Pa. 4 miles of 12" and 8" pipe between Marcus Hook and Chester, Pa. 20 miles of 6", 4" and 2" pipe between Zieglersville and East Greenville, Pa.

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS

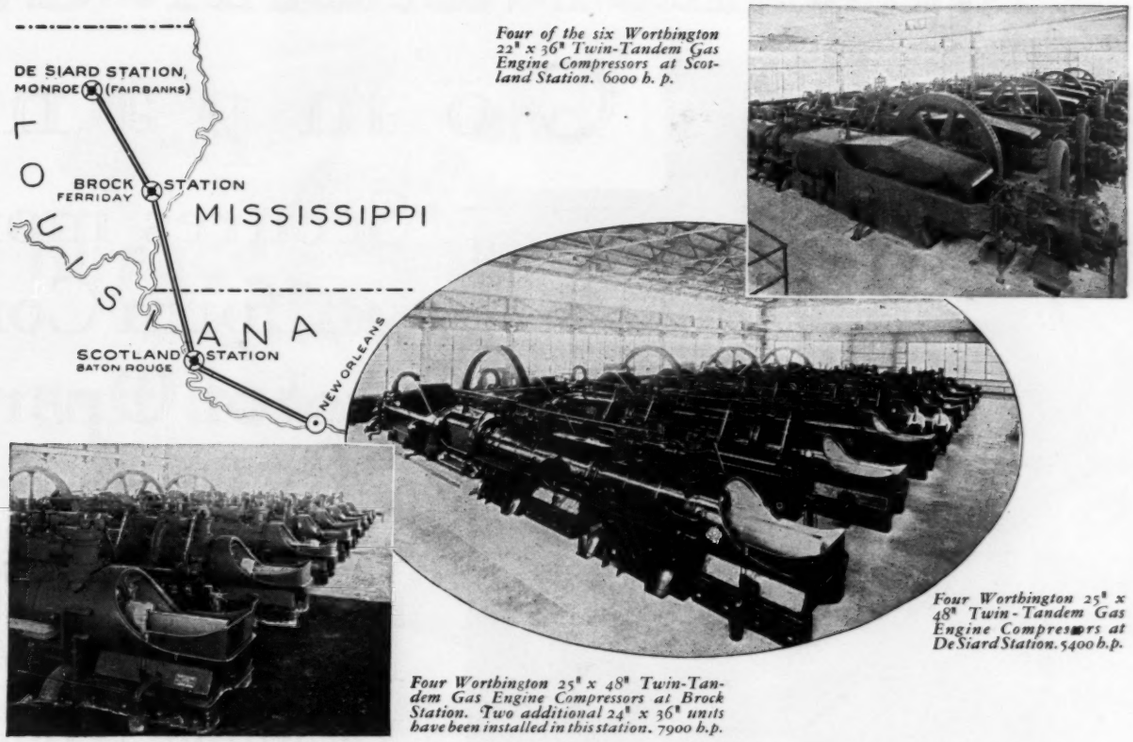
INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

Philadelphia
Broad and Arch Streets

Conway Building
Chicago

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED



Four of the six Worthington 22" x 36" Twin-Tandem Gas Engine Compressors at Scotland Station. 6000 h. p.

Four Worthington 25" x 48" Twin-Tandem Gas Engine Compressors at De Siard Station. 5400 h.p.

Four Worthington 25" x 48" Twin-Tandem Gas Engine Compressors at Brock Station. Two additional 24" x 36" units have been installed in this station. 7900 h.p.

19,300 Worthington Horsepower

Pumping Gas from Monroe to New Orleans

THE three compressor stations on the Monroe-New Orleans Pipe Line of the Interstate Natural Gas Company are all equipped with Worthington Twin-Tandem Gas Engine Compressors . . sixteen units developing 19,300 horsepower.

Worthington equipment was selected for this line squarely on its record of ability to operate with steady reliability and low maintenance cost.

As the oldest gas engine builder in the United States, with an installed horsepower of 370,154, Worthington possesses a background of experience that is reflected in every engine produced.

Through their associates, A. M. Lockett and Company, New Orleans, Worthington is equipped to construct pipe line compressor stations, complete in every detail.

Write for a copy of Bulletin S-550-B1. It contains illustrations, sectional views and detailed description of Worthington Gas Engine Compressors.

WORTHINGTON

PUMPS
COMPRESSORS
CONDENSERS *and* Auxiliaries
DIESEL ENGINES
GAS ENGINES
FEEDWATER HEATERS
WATER, OIL *and* GASOLINE METERS

Literature on Request

EGR-3

WORTHINGTON PUMP AND MACHINERY CORPORATION

Works: Harrison, N. J. Cincinnati, Ohio Buffalo, N. Y. Holyoke, Mass.
Executive Offices: 2 Park Avenue, New York, N. Y.
GENERAL OFFICES: HARRISON, N. J.

District Sales Offices:

Atlanta	Chicago	Dallas	El Paso	Los Angeles	Philadelphia	St. Paul	Seattle
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Buffalo	Cleveland	Detroit	Kansas City	New York	St. Louis	San Francisco	Washington

Branch Offices or Representatives in Principal Cities of all Foreign Countries

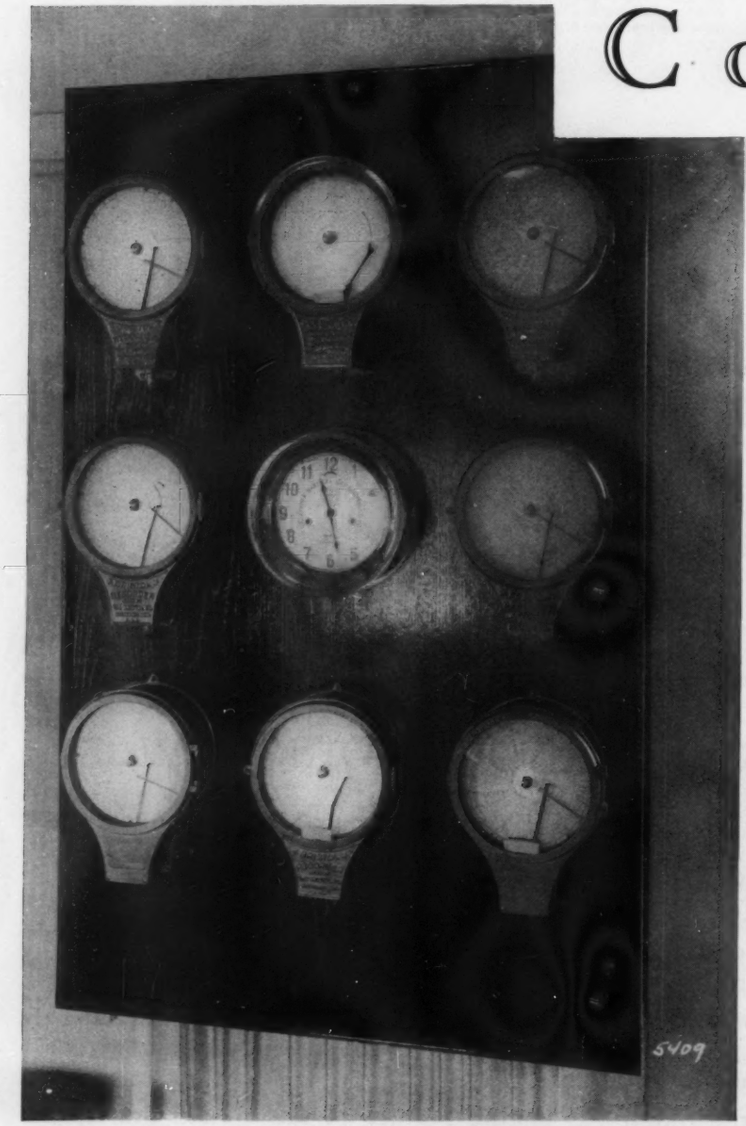
WORTHINGTON

Oklahoma Natural Gas Company

Secures more uniform Control of Operating Pressures

under direction of

BRISTOL'S Recording Gauges.



Bristol's Gauges shown above are used to record Gas Pressure in West line; on South line; on East line; Emergency discharge line; Intermediate Gas pressure at plant; Regular discharge line to City of Okmulgee, and Gas pressure at by-pass on South line.

Gas Pressure on incoming lines from the field, as well as the pressure in lines to the City of Okmulgee are automatically recorded by Bristol's Instruments shown in the accompanying illustration.

As these records are continuous, reference to the various instruments shows just what the pressure is; what it has been, and whether the trend is up or down or steady. Thus operatives are guided in regulating pressures, so as to assure both operating economy and good service. Also company officials have an unbiased, easily understood, report on each day's operation.

After operating a number of years these Bristol's Gauges have made an enviable record for accuracy, and trouble-free service . . . having required only minor re-adjustment and such routine attention as winding, changing charts, re-inking, etc.

Get in touch with our nearest Branch Office. District Sales Engineers will be glad to help solve your instrument problems. This engineering service carries no obligation.

The Complete Bristol's line of Recording Instruments Includes:

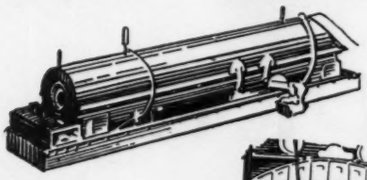
Pressure-Vacuum Gauges, Thermometers, Psychrometers, Liquid Level Gauges, Pyrometers, Mechanical Motion Recorders, Electrical Operation Recorders, Voltmeters, Ammeters, Wattmeters, etc. Also both Air and Electrically-Operated Controllers and Motor Operated Controller Valves.

The Bristol Co., Waterbury, Conn.

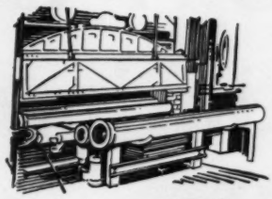
Branch Offices:
Rialto Bldg., San Francisco, Calif.

Boston	Philadelphia	Birmingham	Detroit	Denver
New York	Pittsburgh	Chicago	Akron	St. Louis

This water-cooled metal mold



and this annealing furnace



transform crude cast iron

into the fine grained

metal of deLavaud pipe which is strong and flexible

Examine a section of deLavaud cast iron pipe and note the fine and even grain of the metal. Laboratory tests have shown that deLavaud pipe combines flexibility with at least 25% greater strength.

The reason for the fine granular structure of deLavaud pipe metal is due to its unique process of manufacture. deLavaud pipe is cast in a rapidly revolving cylindrical mold. This mold is cooled by a specially constructed water jacket. When the molten iron comes in contact with the chilled surface of the mold, the abrupt change of temperature brings about the uniformly fine division of the iron particles.

Immediately upon leaving the machines, every length of deLavaud pipe is placed in a large annealing oven. Here *accurately controlled* heat further improves the metal, eliminating all possibility of casting strains, and bringing about the flexibility and strength that only deLavaud pipe can offer.

Let us send you the deLavaud handbook which contains complete information about deLavaud pipe and fittings.

United States Pipe and Foundry Co., Burlington, N.J.

Our pipe bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

Branch Offices:
New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

Gas and Oil Lines Completed During 1929 by Smith Bros., Inc. General Contractors

Texas Oil Company electric welded line from Winkler County, Texas to Port Arthur, approximately....580 miles

El Paso Natural Gas Company, electric welded line, from Lea County, New Mexico to El Paso.....205 miles

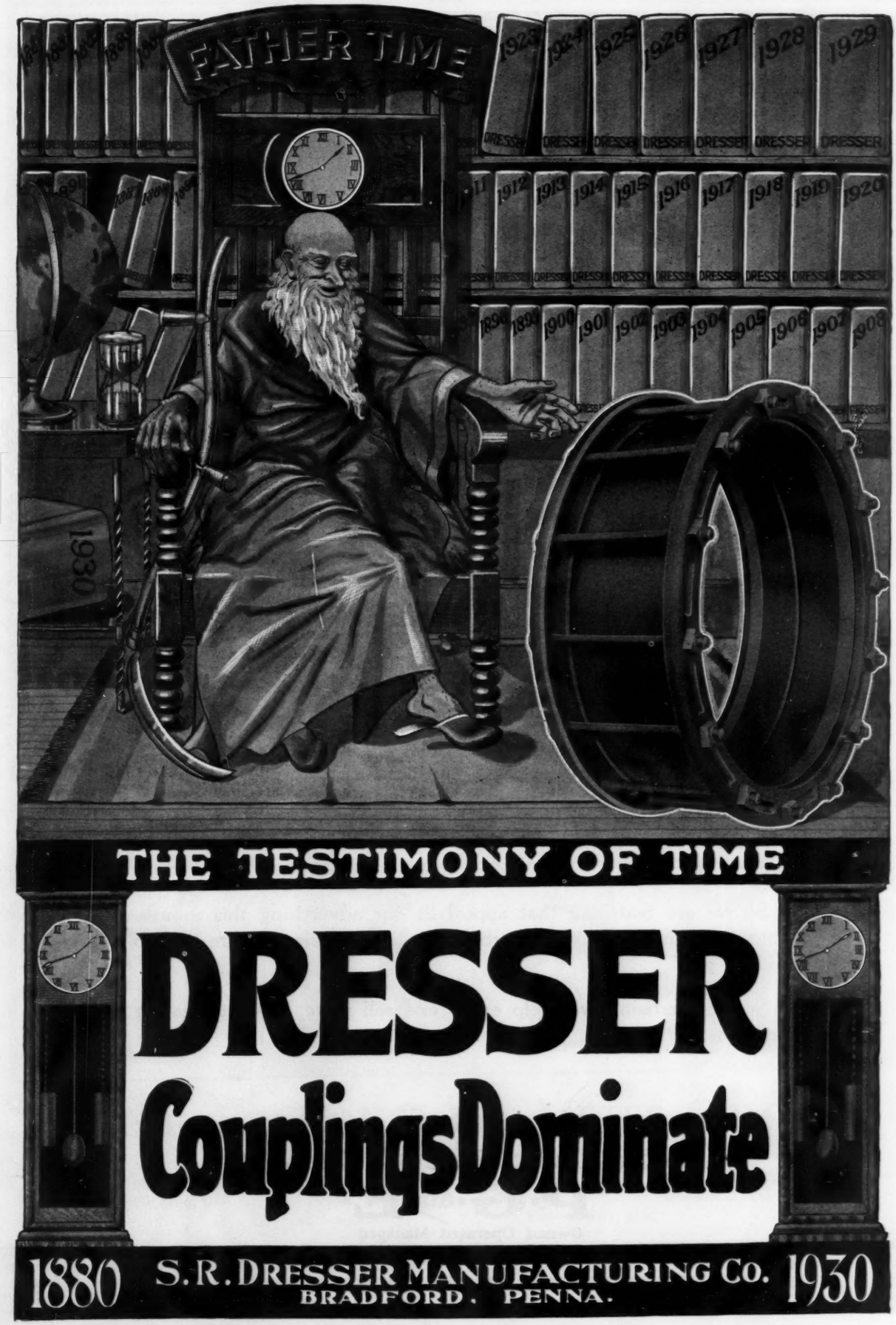
United Gas Company, electric welded and Dresser coupled line from Refugio gas fields, Texas, to San Antonio, approximately .....100 miles

United Gas Company, electric welded line from Jennings field, Zapata County, Texas to Monterrey, Mexico..... ..... 143.34 miles

SMITH BROS., INC.

General Contractors

Dallas, Houston, San Antonio, Crockett


FATHER TIME
1923
1924
1925
1926
1927
1928
1929
1930
THE TESTIMONY OF TIME
DRESSER
Couplings Dominate
1880
S. R. DRESSER MANUFACTURING CO.
BRADFORD. PENNA.
1930

Heat
- at a finger's touch
With a furnace or boiler burning natural gas, the temperature of your home is regulated from upstairs by means of a push-button or a thermostat. No trips to the basement on cold mornings. No bother about heat when friends come. The air in your home is warm and healthful. Curtains, wall-paper and furniture retain their fresh cleanliness. There is no smoke or soot about your property.
Even though you have no basement, there are fine types of gas-fired equipment for your home.
Natural gas contains twice as much heat as manufactured gas. It is a much cheaper fuel. Natural gas is the easiest fuel to control. It is absolutely safe when burned in modern appliances, correctly installed.
For full details about heating equipment that burns the cheap natural gas, see a heating contractor or phone or call at our office.
COMING SOON
Natural Gas
SERVED BY THE
PACIFIC GAS AND ELECTRIC COMPANY

Reproduction of 4 column 15" newspaper advertisement.

Here's a Great Sales Appeal for Gas-Fired Heating Equipment

The use of gas fuel for heating banishes furnace drudgery forever.

The same thought may be expressed in many different ways, but the fundamental truth holds. Ask any heating salesman. He will confirm it.

So we are featuring that appeal in our advertising this month. And notice in the above advertisement that we also feature "cheap natural gas."

Such advertising will help **every one** sell more gas-fired heating equipment.

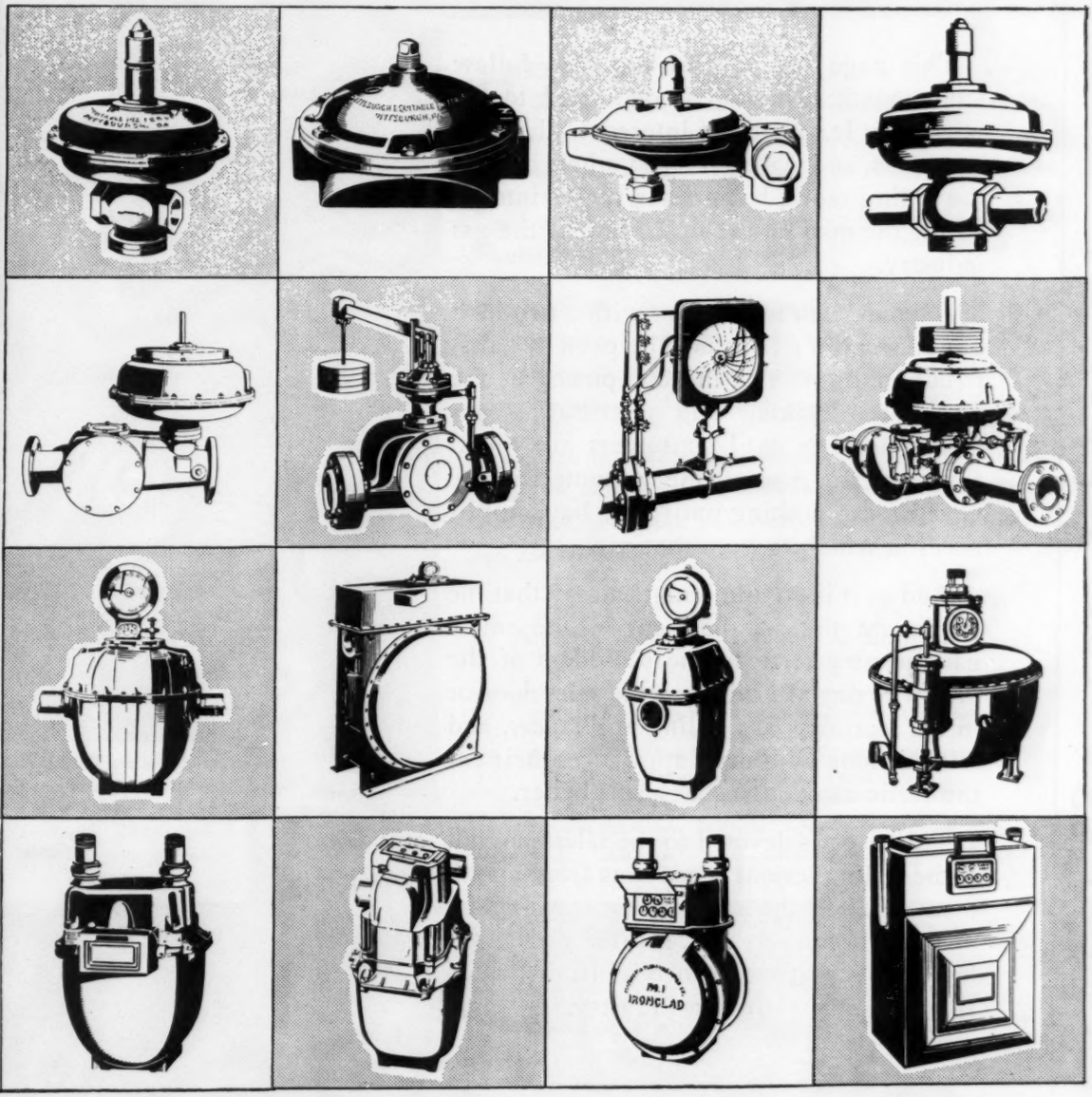
PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed
by Californians

EMCO

THE ONLY COMPLETE LINE OF METERS AND REGULATORS



PITTSBURGH EQUITABLE METER COMPANY

Main Office and Works—Pittsburgh, Pa.

New York City · Chicago, Ill. · Tulsa, Okla. · Dallas, Texas · Los Angeles, Calif. · Columbia, S. C. · Salt Lake City · Kansas City, Mo. · Seattle, Wash. · Houston, Texas

EMCO METERS AND REGULATORS

Selling Radiant Heat

A Practical Page for Appliance Salesmen

No. 1

Now What?

No. 112

A ten radiant fire in the Colonial Design, made of solid bronze. For fireplace openings from 24 to 36 inches wide.

This page and several pages to follow from month to month is dedicated to the salesmen. It may be of interest to the sales managers, and it may interest others outside the selling ranks, but primarily it is intended for the man on the firing line of the gas industry.

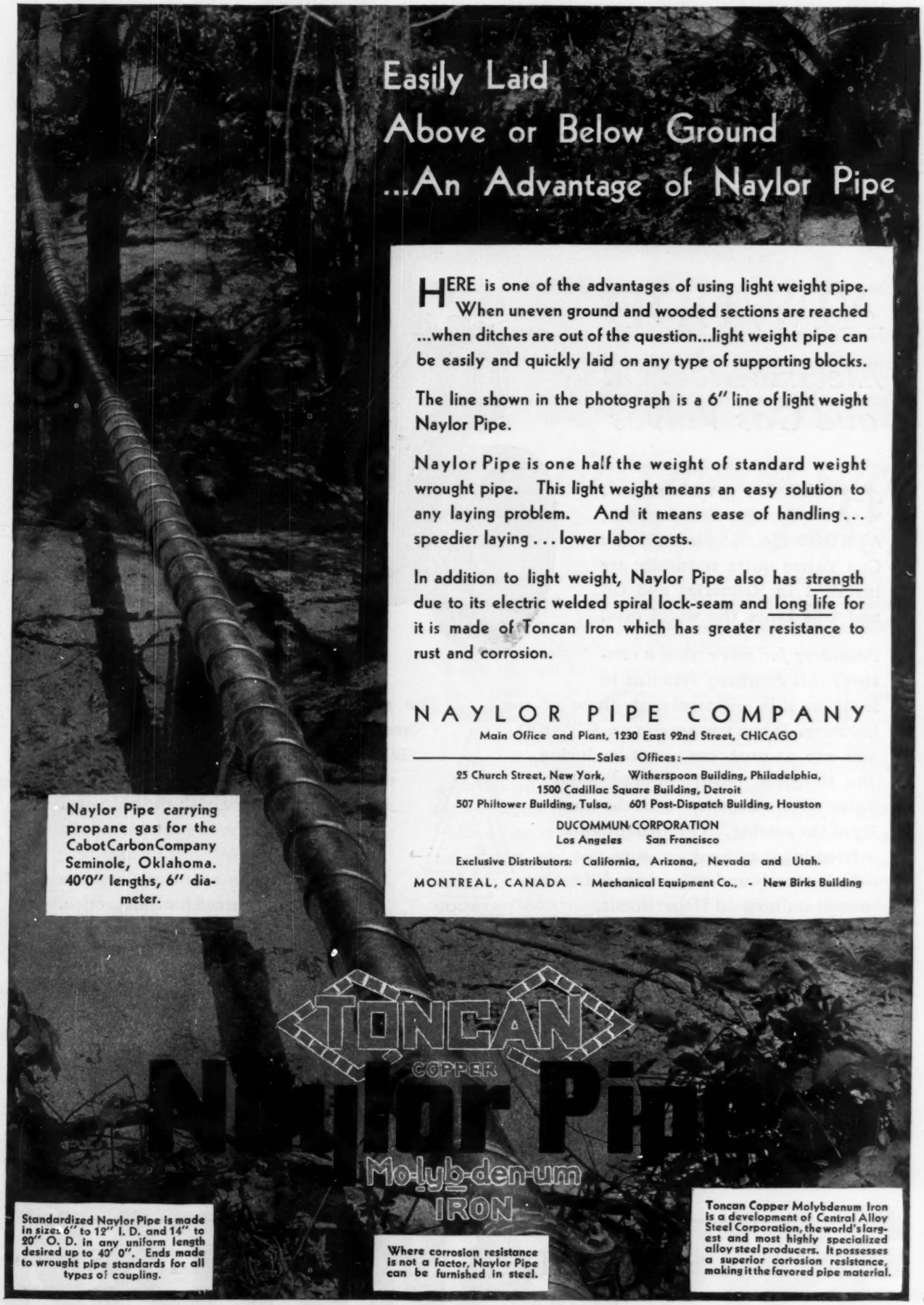
A ten million foot holder with a two-inch outlet wouldn't be much help on the distribution lines. All the equipment in the world for making and distributing gas means nothing until consumers are found for that gas. And all the consumers in the world mean nothing until they have appliances in which to burn that gas.

And so it is no idle remark to say that the burden of the advancement of the entire gas industry rests on the shoulders of the men who day after day, on the sales floor or in the territory, are selling appliances, and selling along with these appliances their enthusiastic conviction that gas is better.

This page is devoted to the salesmen, but if the selling lessons it contains from month to month show the salesman the way to more money for himself and greater profits for his company, it will prove itself, dedicated as well, to the entire gas industry.

The HUMPHREY
Radiantfire
TRADE MARK REG. U.S. PAT. OFF.

C. B. Babcock **135 Bluxome St., San Francisco** **Pac. Coast Mgr.**



Easily Laid Above or Below Ground ...An Advantage of Naylor Pipe

HERE is one of the advantages of using light weight pipe. When uneven ground and wooded sections are reached ...when ditches are out of the question...light weight pipe can be easily and quickly laid on any type of supporting blocks.

The line shown in the photograph is a 6" line of light weight Naylor Pipe.

Naylor Pipe is one half the weight of standard weight wrought pipe. This light weight means an easy solution to any laying problem. And it means ease of handling... speedier laying... lower labor costs.

In addition to light weight, Naylor Pipe also has strength due to its electric welded spiral lock-seam and long life for it is made of Toncan Iron which has greater resistance to rust and corrosion.

NAYLOR PIPE COMPANY

Main Office and Plant, 1230 East 92nd Street, CHICAGO

Sales Offices:

25 Church Street, New York, Witherspoon Building, Philadelphia,
1500 Cadillac Square Building, Detroit
507 Philtower Building, Tulsa, 601 Post-Dispatch Building, Houston

DUCOMMUN CORPORATION
Los Angeles San Francisco

Exclusive Distributors: California, Arizona, Nevada and Utah.

MONTREAL, CANADA - Mechanical Equipment Co., - New Birks Building

Naylor Pipe carrying propane gas for the Cabot Carbon Company Seminole, Oklahoma. 40'0" lengths, 6" diameter.

TONCAN COPPER Naylor Pipe Mo-lyb-den-um IRON

Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

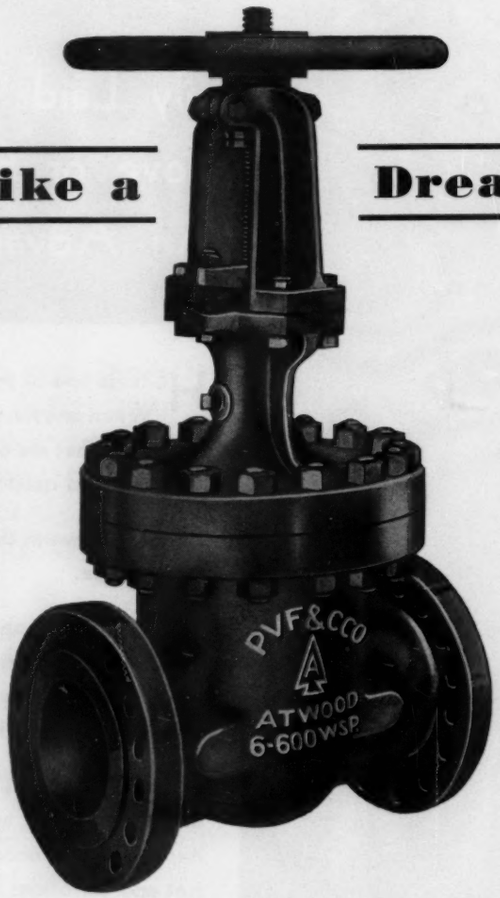
Where corrosion resistance is not a factor, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.

Built like a Dreadnaught

ATWOOD

Electric Steel Oil and Gas Valves



6" (Series 60) working pressure, 600 lbs. for steam, 1000 lbs. for oil and gas, tested hydrostatically to 1500 lbs. Solid Wedge, ATWOOD Electric Steel, Stainless Steel, Monel or Bronze mountings.

BUILT for punishment, sturdy as a Dreadnaught, ATWOOD Electric Steel Oil and Gas Valves quite naturally are installed in Refineries and Oil and Gas Lines the world over.

Founders for more than a century, this company remains in front in this all-important phase of the industry. When you specify an ATWOOD you are assured the most enduring, the toughest valve produced today. Valve service depends upon the quality of the casting. ATWOOD quality —from ingot to final pressure test —is absolutely under the control of our Metallurgical Department.

Trade Mark
ATWOOD

The most advanced type valve to meet every Oil, Gas and Steam Line condition is listed in the ATWOOD Line, the result of 70 years' research in developing sizes and patterns apace with the industry. Mountings can be furnished in Monel, Stainless Steel or Bronze— as the service requires—and are fully guaranteed for that service.

Send for ATWOOD Oil and Gas Valve Bulletin 100.

PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO.
PITTSBURGH ~ PENNA.

DISTRICT OFFICES

New York City	30 Church Street
Chicago, Ill.	80 East Jackson Blvd.
Boston, Mass.	185 Devonshire Street
Cleveland, Ohio	858 Rockefeller Bldg.

REPRESENTATIVES

Detroit, Mich.	Garrett Burges, Inc., Woodbrook Bldg.
Houston, Texas	Maintenance Eng. Corp., 1400 Conti Street
Atlanta, Ga.	Moore-Broach Eng. Co., Forsyth Bldg.
Philadelphia, Penna.	R. J. Crozier Co., 10 South 18th Street
Los Angeles, Cal.	John G. Bell Co., 712 East Sixth Street

· · · VALVES ▲ WELDED PIPING ▲ FITTINGS · · ·

They first made sure of the Right Pipe!

IT is a costly job to lay several lines of pipe across a stream—costly in time, labor, and extra material and equipment involved. Experienced engineers know just where to begin in making certain that the investment will be properly safeguarded. They first make sure of the right pipe—knowing that this is the foundation of successful submerged pipe lines.

The photograph above shows one of the crossings of a 200 mile, 18-inch, NATIONAL Pipe line. Laying of this line involved crossing the Mississippi and four other rivers in addition to swamps, stretches of gumbo, etc.—a job requiring sound engineering practice and reliable materials.

The extensive use of NATIONAL Pipe for lines involving exceptional engineering difficulties is substantial evidence of the dependability of this product for installation where future repairs would be costly with possible extended delay of service. Dependability under all conditions of service is the first requirement in the manufacture of NATIONAL Pipe—one of the reasons why NATIONAL is

AMERICA'S STANDARD WROUGHT PIPE

NATIONAL TUBE COMPANY · Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL PIPE

Manufacturers Evidence No Retrenchment in the *Gas* Industry

—least of all in the West

The December issue of *Western Gas* closed the year 1929 with the greatest advertising increase in its history—a gain of 40% over 1928.

This represented 127 advertisers, leaders in supplying the gas industry with its needs.

WHAT OF 1930----?

The January 1930 issue of *Western Gas* contains 64% more advertising than was carried in January 1929.

The circulation of *Western Gas* in the territory *west of the Mississippi River* will reach a new high point during 1930.

In 1930 the Gas Industry will spend $425,000,000 for new construction.

WESTERN GAS

124 West Fourth St. **Los Angeles, Calif.**

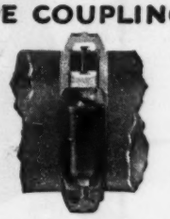
"For every joint on every line"

FLEXIBLE LEAK-PROOF

VICTAULIC

REG. U.S. PAT. OFF.

PIPE COUPLINGS



"For every joint on every line"

Quick, tight, permanent, economical **— flexible expansion joints between every pipe length.**

All pressures from vacuum up — for all sizes of steel, wrought iron, cast iron, and spiral weld pipe.

Mail the coupon for details.

VICTAULIC COMPANY OF AMERICA
26 Broadway New York

VICTAULIC
DISTRIBUTORS

Mid-Continent and Southern
HANLON-WATERS, INC.
Tulsa, Oklahoma

Western
DUCOMMUN CORPORATION
Los Angeles, California

Canada
D. B. McWILLIAMS
Toronto, Canada

Western Pennsylvania
PITTSBURGH SUPPLY COMPANY
Pittsburgh, Pennsylvania

Illinois, Indiana
BELL and GOSSETT
Chicago, Illinois

Ohio
CASE HARDENING SERVICE CO.
Cleveland, Ohio

Minnesota, Wisconsin, Iowa
F. S. VAN BERGEN
Minneapolis, Minnesota

FOR CRUDE OIL GAS WATER SEWAGE COMPRESSED AIR ETC.

For uses, installations, specifications and prices, fill in and mail this coupon.

VICTAULIC COMPANY OF AMERICA
26 Broadway New York

Please send Victaulic Bulletin No. 6

Name.....

Address.....

— type 519 Boiler Pressure Governor for high or low pressure boilers burning low pressure gas— other types for high pressure gas and special jobs.

Fisher's Automatic Fireman for Gas-Fired Boilers

It is Fisher's self-appointed job to provide perfect fluid control for every imaginable type of service.

Here you see a typical Fisher specialized development, that makes gas-fired boiler operation automatic.

Day in and day out, its feather-touch control increases or decreases gas flow to maintain a steady steam pressure within the boiler. And always sending through sufficient gas to keep pilot fires going.

The design of the Type No. 519 is distinctly original with Fisher, having extra large ports and a perfected stream line flow body. These points of design are the NEW features which give the finer touch of control to the Fisher Boiler Gas Fuel Governor.

More than human in its operation, this Fisher Specialty typifies what Fisher is constantly doing in its laboratory to develop new controls—and to make them absolutely perfect in their operation.

World's Longest Line

Steam Pump Governors
[10 to 10,000 lbs.]
Boiler Feed Pumps
Fuel Oil Pumps
Vacuum Pumps
Receiver Tank Pumps
Pump By-Pass Valves
electric and power driven pumps
Reducing Valves, Pressure
Regulators
for all pressures—liquids, gases, steam
Differential Pressure Regulators
Vacuum Regulators
Strainers
pipe, suction and drip pocket
Liquid Level Controllers
direct and remote type
Lever Valves
air, gas, or liquid
Float Valves
Fluid Mixers
Hydraulically Operated Valves
Relief Valves
Back Pressure Valves
Steam Traps—Air Traps—
Gasoline Traps—Grease Traps
Exhaust Heads
Steam and Oil Separators
Drip Pockets
Vapor Pressure Controllers
for oil storage tanks
Boiler Gas Fuel Governors
Gas Engine Fuel Regulators
Automatic Gas Relief Valves
Gas Pressure Regulators
main and house service
Liquefied Petroleum Gas
Regulators
for gas cylinders
Gas Water Traps

There is no book in existence like this Fisher Catalog —detailing design and application of Fisher Products. It is the handbook on Fluid Control—copies sent when requested on business stationery.

FISHER

THE FISHER GOVERNOR COMPANY, Inc.

2400 Fisher Bldg.
Marshalltown, Iowa

If a mystic glass could show you how the valve parts will look in ten years

When you are purchasing valves, if you could see what inside workings of the valve will look like after good hard use, it would be no problem at all to pick the right valve. And the Darling Valve is the valve you would pick, even though it does cost more. It has the stamina to continue in giving first class service long after valves that cost a little less have been discarded.

DARLING VALVE & MFG. CO.
Williamsport, Pa.
New York Chicago Oklahoma City Houston

DARLING
GATE VALVES

Western Coverage—
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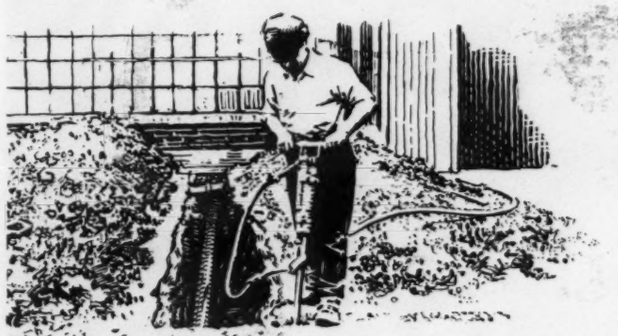

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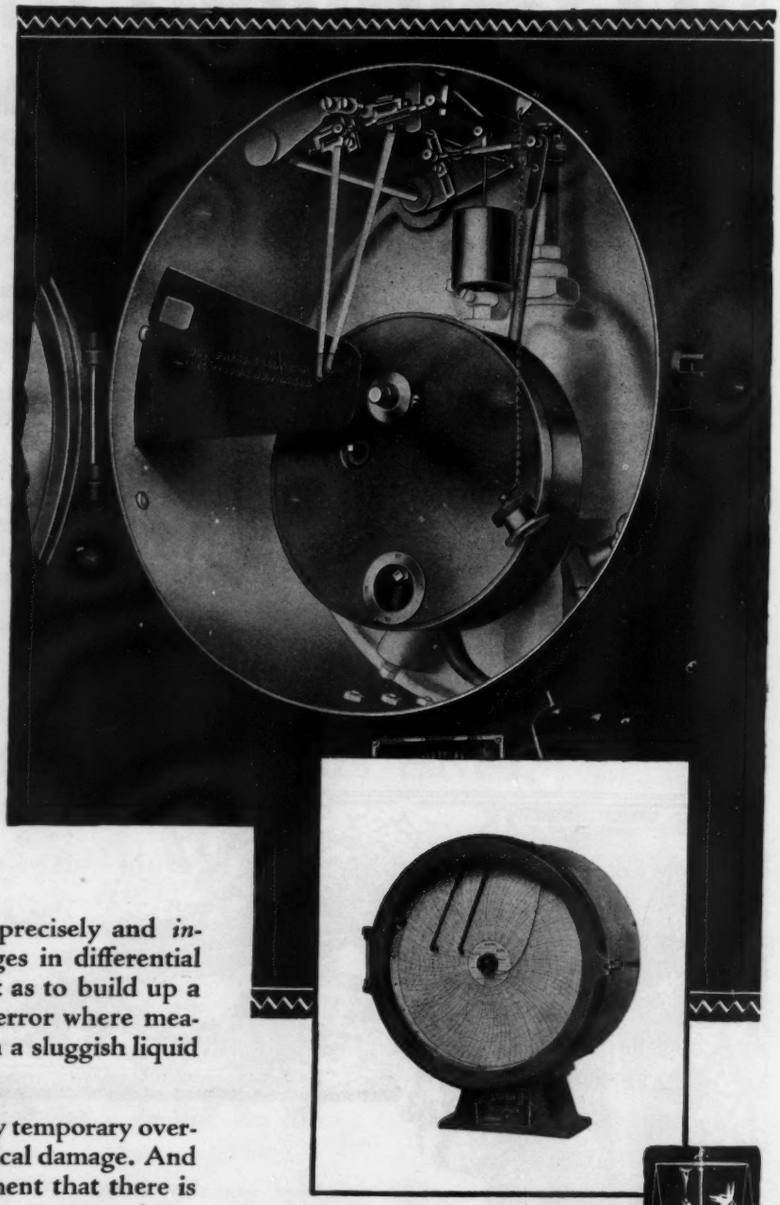

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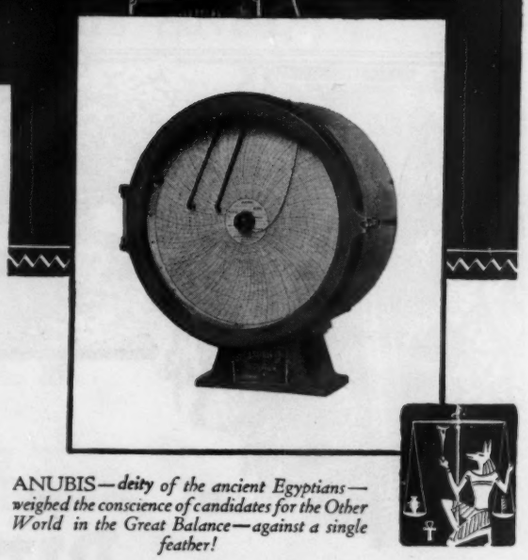

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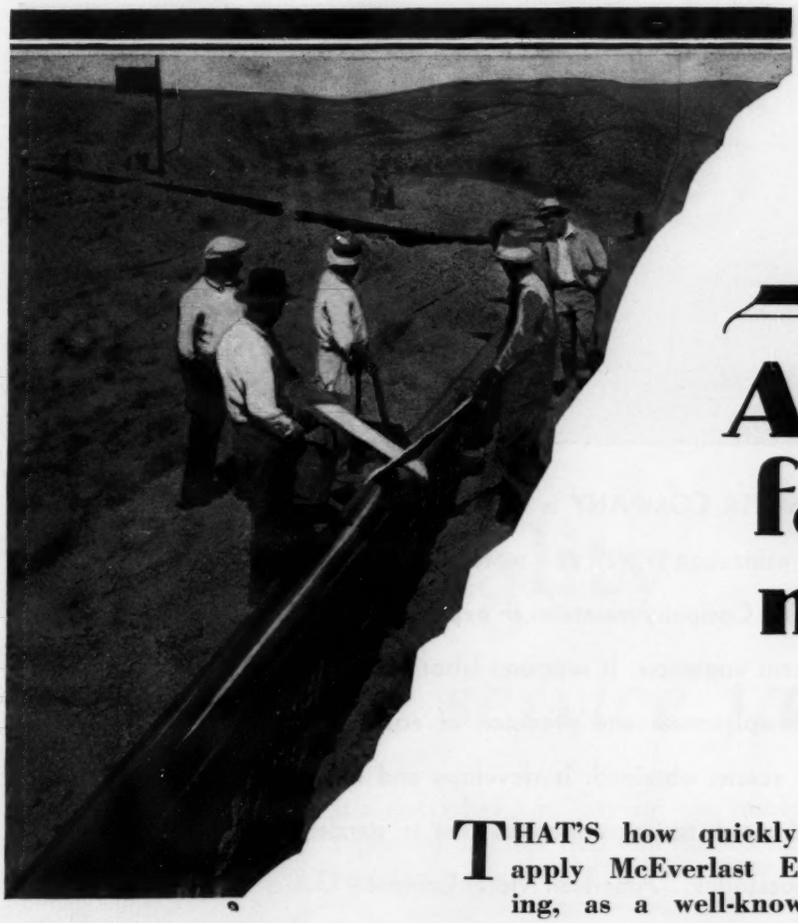

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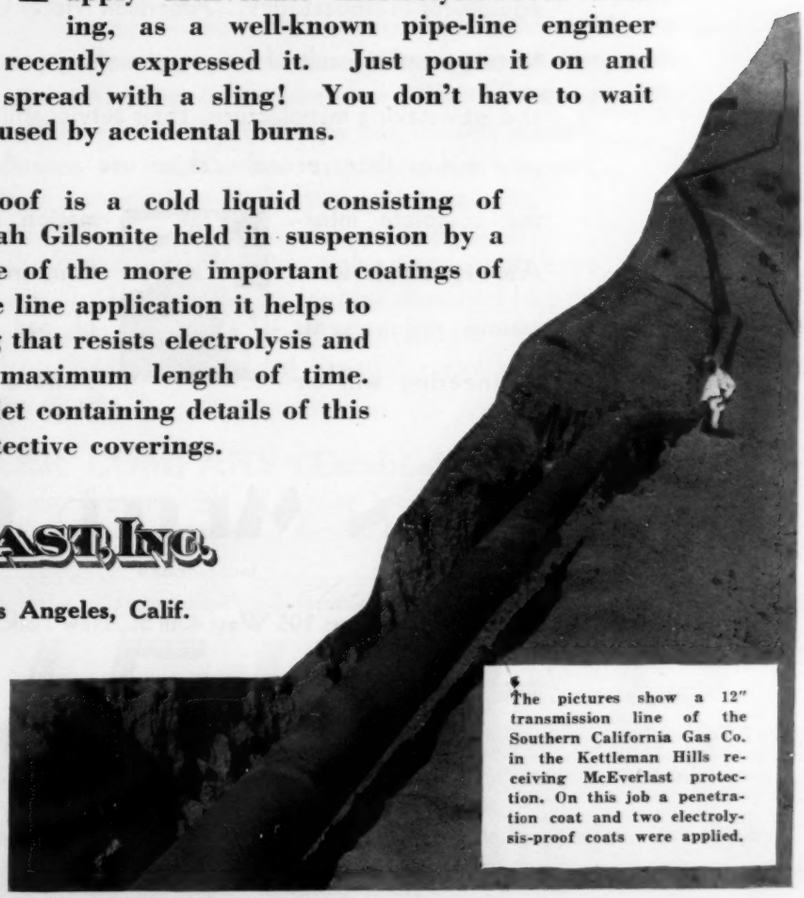

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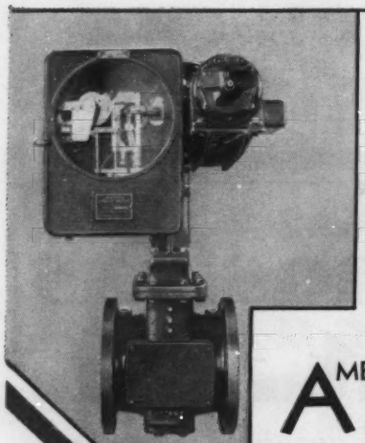

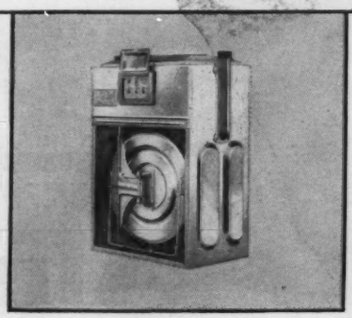

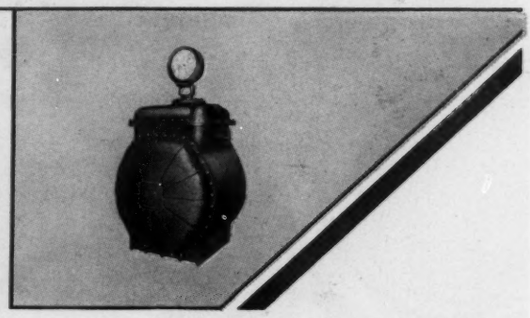

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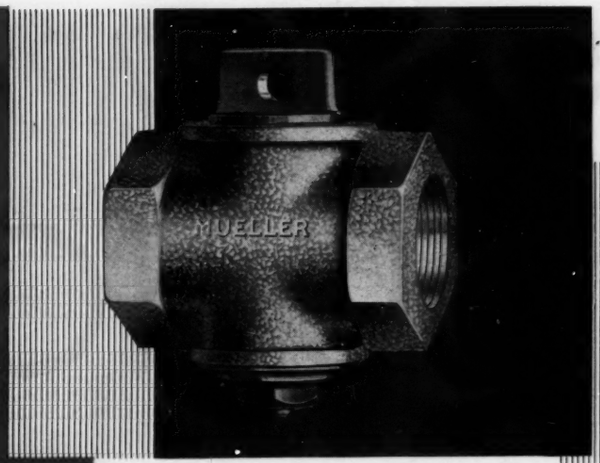
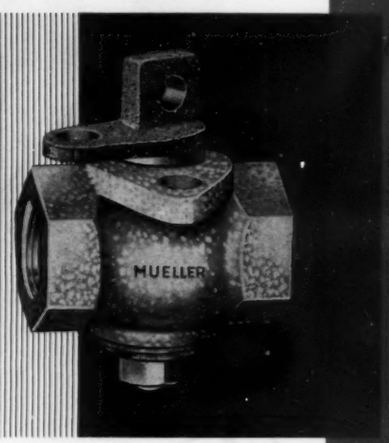


At left: Mueller G-11100 Flat Head, Iron Body Brass Plug Service Stop. *Below:* Mueller G-11080 Iron Body Brass Plug Meter Stop.



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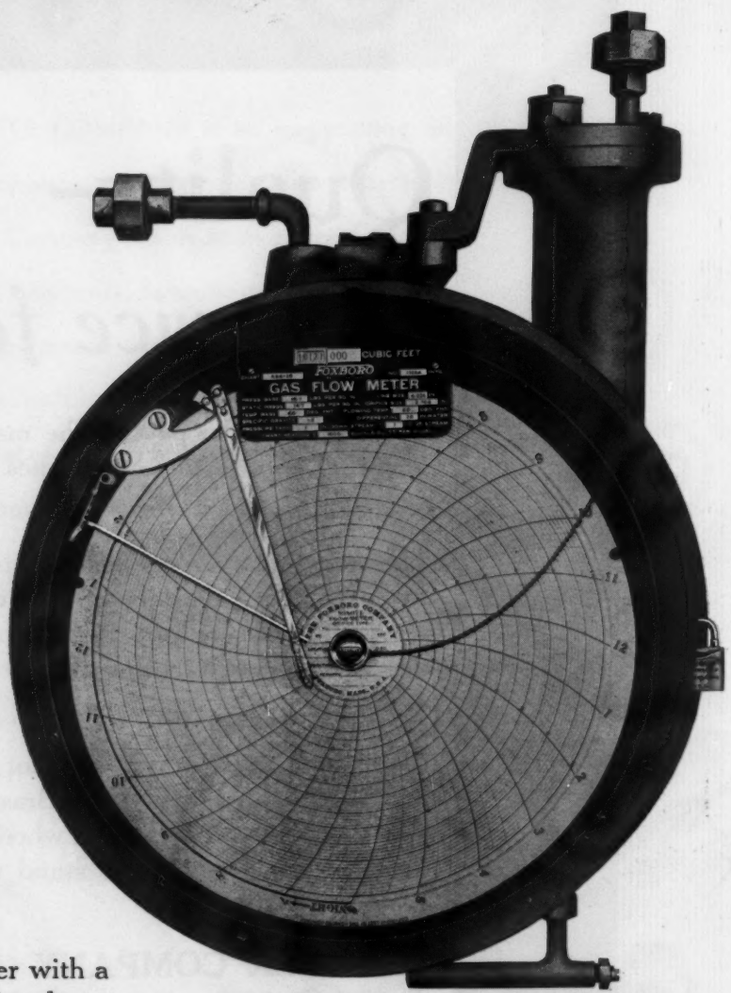

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SAN FRANCISCO **LOS ANGELES** **DALLAS**

Reviewing *a* Memorable Year *for* Gas *in the* West

By GEORGE H. FINLEY
Managing Editor, WESTERN GAS

IT IS the chief purpose of this brief review to recount a few of the many enterprises and achievements of 1929 which made that 12-month period a notable one among recent years in the western gas industry. To this end a month-by-month survey of the year is included at a later point.

On the basis of its 1929 advance the industry enters the new year with a stability and a forward drive which make for well-founded optimism. A glance at this new year prospect for the industry as a whole will perhaps be the best introduction to a summary of 1929 progress.

Individual company programs for 1930 indicate that we may expect normal expansion, probably accelerated beyond that of average years by several large gas line projects which will go toward completion this year. To judge what the new year will mean for the western industry, where the bulk of this development will transpire, we commend a reading of the news columns of this issue, in which many of the programs are announced.

For a picture of the country-wide program we can do no better than quote from the conservative statement prepared for President Hoover by utility leaders, for the purpose of establishing that the utilities of the nation will take a leading position in "prosperity-stabilizing" in the year ahead. These paragraphs from the statement referred to give ground for belief that 1930 will be no laggard year in gas expansion:

"The American Gas Association Statistical Department estimates that expenditures for construction by the manufactured and natural gas industry of the United States in 1930 will aggregate approximately $425,000,000, an increase of about 6 per cent over the corresponding expenditures in 1929. An additional $50,000,000 will be expended to maintain existing service facilities.

"The construction estimate is based primarily upon budget provisions already formulated for 1930 by companies representing the major part of gas production and distribution in the United States. The conclusions thus indicated have been checked against the factual experience of the industry for many years, as well as against current observation and information, and have been correspondingly strengthened.

"These and collateral facts, trends and factors have been coordinated with obvious necessities in estimating the construction requirements of the industry for 1930. The net results, as summed up in the first sentence of this statement, have been reviewed by officers of the

(*Continued on Page 53*)

Natural Gas Department Moves West

ON December 20, from Managing Director Alexander Forward at American Gas Association headquarters, came this statement:

> *"Due to the unusual expansion and growth of the natural gas industry in the Southwest and West, the Natural Gas Department of the American Gas Association, with the approval of the Department's executive committee, will close its Pittsburgh office on January 1, and reopen in Dallas, Texas."*

The wisdom of this step, which centers the administration of natural gas associational work at Dallas, in the heart of the natural gas empire, will be unquestioned. A.G.A. officials and the executive committee of the Department in this decision are bringing the benefits of the national Association home to the natural gas industry.

E. J. Stephany, secretary of the Natural Gas Department, continues in charge of that office, and effective January 1, makes his headquarters in Dallas.

With plans under consideration for holding a Western Division Natural Gas Convention in New Orleans in May, 1930, natural gas men see the new year starting off under the best of auspices.

Every Employee *a* Salesman

General Employees Sell $50,000 in Gas Appliances During Portland Gas and Coke Company Campaign

By ELLIOTT TAYLOR
San Francisco Manager
Western Gas

SALES executives are fast coming to recognize the potential asset of the entire gas company personnel in their selling programs. For sales departments interested in what can be done through general employee cooperation, the following description of a three-months selling campaign which was recently completed by the Portland Gas & Coke Company should be of value. This campaign of the Portland utility resulted in the sale of approximately $50,000 in appliances through the organized activities of the employees of the company not on the regular sales force. J. Earl Jones, then assistant sales manager for the company, was responsible for the campaign. Mr. Jones has subsequently accepted the position of commercial manager for the Seattle Lighting Company at Seattle, Washington. For the benefit of our readers he outlines the campaign plan used in the Portland sales drive, which was in essence as follows:

THE general employees selling program in Portland is the outgrowth of the experience gained in the company's first preferred stock sale some three years ago. At this time a large amount of securities were sold through the general employees and we, the sales department, realized then for the first time the potential value of 900 enthusiastic gas company emissaries comprising the various departments not actively identified with selling.

For some time the practice has been followed of paying a 2 per cent commission to employees on any sales made to prospects turned in by them. Elaborating on this plan, and injecting the spirit of competition by making it an interdepartmental contest, the sales set-up was ready for action. While the sales department was behind the scenes with suggestions and counsel as to the best sales procedure, the contest itself was in charge of an executive committee composed of one representative from each department which had a crew entered. Realizing that certain departments—for example, the service men—had a decided advantage over others who seldom came in contact with the general public, a bogie or quota in points was worked out.

The total sales quota for the three months was 800 points, representing approximately $50,000 in sales. The minimum quota was 480 points, approximately $30,000. It was understood that no prize money would be distributed unless the minimum quota was reached.

The bogies in points set up for each of the 13 teams were as follows:

	DEPARTMENT	POINTS
1.	Bookkeeping and Office, General	40
2.	Credit Bureau	40
3.	Contract Bureau	80
4.	Operating Office, Supply Bureau and Garage	60
5.	Production Bureau	40
6.	Distribution Bureau	60
7.	Fitters	60
8.	Service Men	205
9.	Shop Office and Engineers	65
10.	Meter Shop and Tin Shop	65
11.	Purchasing	20
12.	Treasury	25
13.	Sales Office and Briquet Crew	40
		800

The prize money was to be apportioned on the basis of 75 cents per unit, which meant that if the bogie were sold, total prizes would amount to $600. Team prizes were then divided as follows, percentages being based on total money appropriated:

First Prize	25%	$150.00
Second Prize	20%	120.00
Third Prize	15%	90.00
Fourth Prize	12%	72.00
Fifth Prize	10%	60.00
Sixth Prize	8%	48.00
Seventh Prize	6%	36.00
Eighth Prize	4%	24.00

The division of the money won by the team amongst the members of that team was in proportion to the amount that each individual added to his team's total sales. Points that went to make up the bogie were allotted for sale of the various classes of gas appliance merchandise as follows:

Tankheater	1
Gascotrol	1
Full Automatic Water Heating Systems	5
Cooker	1
Used, or Open Top Gas Range	1
Radiantfire	1
Gasco Furnace and Gas-Fired Boiler	5
Refrigerators	3
Washers	2
New Closed Top Gas Range	3
Room Heater, Heatrola, Garage Heater and Floor Heater	2
Merchandise Small Items, each $25.00 Value	1
Ironers	3
Dryers	4
Incinors	4

Where sales were made directly by members of the teams themselves, full credit in points was given according to the table on the item sold. Where sales were made, however, by members of the sales department to prospects turned in by members of the competing teams, half credit only was given. In addition to the prize money, regular commissions paid were as follows: On direct sales, 5 per cent for the first $100 and 2 per cent for all over $100 on any individual sales; and 2 per cent on all sales closed to prospects turned over to regular salesmen. All prospects received on regular printed slips provided for this purpose were turned over to field salesmen for follow-up.

The system of selling employed by the Portland Gas & Coke Company is that of a divisional plan of sales organization with 18 unit territories covered by district salesmen.

To keep alive the interest in the campaign, a weekly bulletin was issued showing the relative standing of each individual team. It showed the number of points scored and the percentage of the bogie that had been reached. The bulletin itself did much towards livening up the contest and also acted as a very good working manual on how to sell various appliances. Individual names were freely used to give a personal touch to everything that was said, and the committee in charge of this phase of the activities did not hesitate to mention the teams that were backward in getting started, as well as giving credit to those who were always well ahead of their quota.

The final results of the campaign were as follows: Shop office and engineers won first place by selling 209.2 per cent of their bogie. Meter and tin shops won second, selling 200 per cent; and the service men third, selling 131.2 per cent. Fourth place went to the credit bureau which sold 128.6 per cent. Other teams entered fell short of their quota in various amounts, to bring the

(*Continued on Page 64*)

Texas Gas Crosses *the* Border

To Serve Historic Monterrey

By GEORGE BLARDONE
United Gas Company

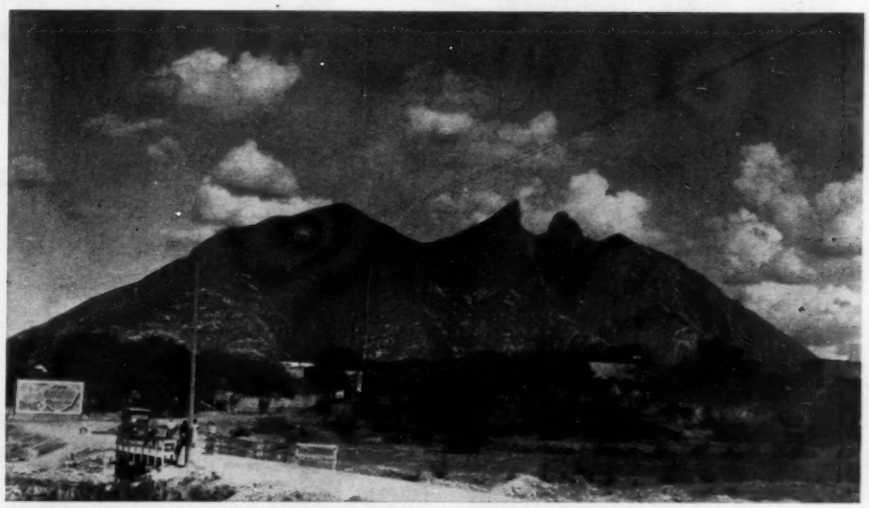
NATURAL gas from the Jennings field in Texas has crossed the Rio Grande to serve one of Mexico's most important industrial centers—the City of Monterrey. Because of the area served, more than ordinary interest attaches to this newly completed development, which involved the laying of 143.34 miles of main line from the Texas gas reserves. Mr. Blardone in his article below not only reviews the United Gas Company's line project, but supplies interesting details on the city of Monterrey, giving a brief historic background and presenting the modern industrial city which natural gas from "across the border" has come to serve.—Editor.

THE modern city of Monterrey, capital of the state of Nuevo Leon in Mexico, is very old, as age is reckoned in the western hemisphere.

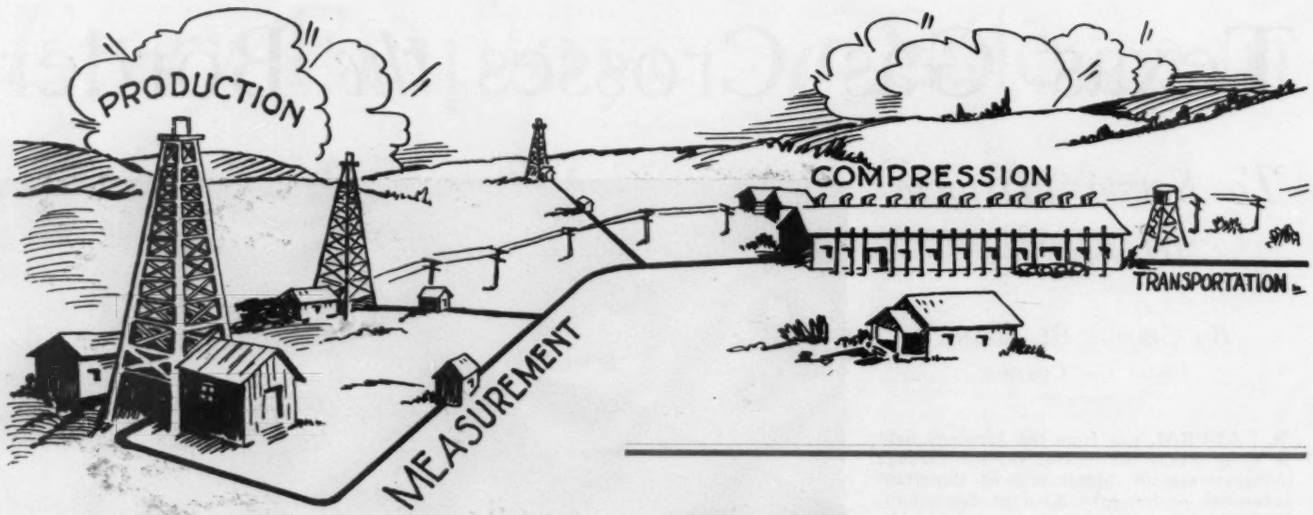
It was in the year of Grace, 1581, that the Spanish conquistadores of Don Luis Carbajal's forces ,who had marched and fought their way up from Tampico, far to the southeast, founded the post of San Luis, where the city of Monterrey now stands. San Luis was destined to be abandoned a little later; but in due time one of Carbajal's lieutenants, a young captain named Diego de Montemayor, returned with a handful of hardy Spanish colonists, and founded a real municipality, organized under the explicit laws of New Spain. This act of organization occurred on September 20, 1596; and the place was named the Metropolitan City of Our Lady of Monterrey, in compliment no doubt to the wife of the new viceroy, Don Gaspar de Zuniga y Acevedo, Count of Monterrey, recently arrived from Spain to reign with authority absolute over all that new and strange empire that stout Cortez had brought under the banner of Leon and Castile.

With the passing of time, Monterrey has evolved into the leading industrial city of northern Mexico. Its final touch from the magic wand of progress occurred the evening of December 2, last, when a natural gas flare was lighted with appropriate ceremonies at the city's boundary; and gas from the Jennings

(Continued on page 63)



UPPER: Imposing Saddle Mountain ("Monte de Silla") at Monterrey, Mexico, seen from the United Gas Company natural gas line right-of-way. CENTER: The camp of Smith Brothers, Inc., contractors on the Monterrey line, near Saddle Mountain. LOWER: Pipe painting in progress on Texas-Monterrey pipe line.



Meeting the

Cooperation Forges the Chain Which Maintains

FOR the manufactured gas man's cry "Keep the Holders Up" the natural gas industry might substitute "Keep the Line Packed" . . . at least in sections where holder storage is not resorted to at distribution centers. Keeping the line packed is not the simple problem that it might appear, when fluctuating demand, well pressures, and a thousand and one other operating factors are considered.

¶ Mr. Martin in his discussion below has drawn the many departmental activities which together produce natural gas service into a composite whole, to show how a production and pipe line system gains the remarkable flexibility which it must have to meet the "spot" demands of a changeable market.—*Editor.*

By J. A. MARTIN

IF I were inclined to the theory that "that which is startling attracts most attention," I might attract attention to this article by saying that supplying the "spot" demand for natural gas fuel is guided by "instinct."

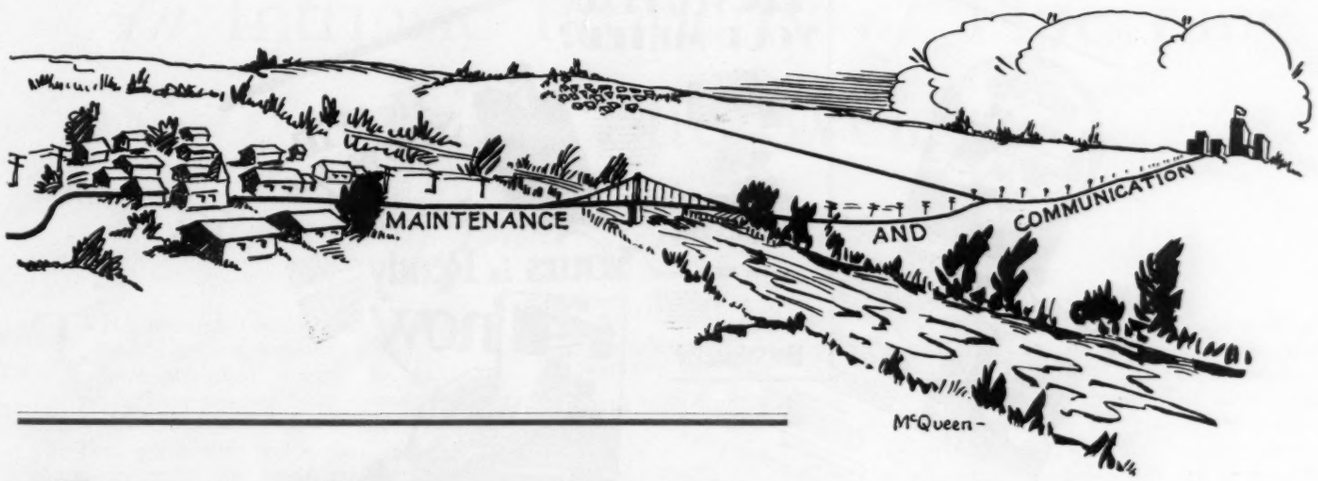
It would be extremely startling to think that maintaining an ample supply of a commodity so vitally important to thousands of domestic and industrial users is dependent on such a vague sense as "instinct." But if you will accept George A. Dorsey's explanation of instinct in his "Hows and Whys of Human Behavior" it is not so far-fetched at that. Mr. Dorsey says in effect: "Instinct is a reflex action of the results of experience and experiment, with their failures and successes, which through repetition or intensity become absorbed by the sub-conscious mind to be released opportunely under the trade name of 'instinct.'"

This being the case, and as the responsibility of ever-readiness to serve rests on the Dispatcher, we readily see the necessity for a large and vigorous instinct as a part of his equipment. Observe—the dispatcher's instinct must tell him first that there is absolutely no alibi acceptable for a shortage of any duration; that the dependence of so many on a commodity so necessary makes it imperative that the supply be adequate at all times. Secondly, that weather predictions are not infallible, and he must have his outposts ever on the alert and means of communication "work-wise," so that when the unexpected cold wave hits the outlying districts he can put his facilities in motion to cause the "supply" to keep pace with the "demand" as it moves in towards the market centers. And incidentally, should the approaching cold wave subside and leave him with a large surplus of fuel with little consumption, his "instinct" must have provided a reservoir line in which to vent the dangerous high pressure while the difficult work of pinching down and "back peddling" on the mighty forces that have been high-speeded to meet the expected "drag" is going on. Or if the cold wave comes up to expectations and becomes protracted so as to tax the resources, his "instinct" must tell him just when to curtail the supply to the industrial consumers so as to be sure of an ample supply for the domestic users.

J. A. Martin

This might settle the question of "spot supply" for "spot demand" were it not for a few minor details such as production, measurement, communication, transportation, and maintenance, which, being more or less mechanical, are not readily responsive to "instinct" and therefore might be more reasonably grouped under the head of "cooperative factors."

And right here let me say that there is probably no industry on earth in which "cooperation" is as vital as in the production, distribution, and dispensing of natural gas. Cooperation is the first and foremost factor that welds the successive steps from field to consumer into the one unit of service necessary to supply a demand which is literally "Just as variable as the weather." To illustrate, let us present a worm's eye view of operations and discuss the successive contributing steps without unduly accentuating cold weather activities, for the reason that the other ex-



Spot Demand

Responsive Service Between Wells and Consumer

Supervisor Transportation and Maintenance, Lone Star Gas Company.

treme of summer operation requires, if anything, even more finesse.

According to the above sketch we should start with Production, but to avoid the embarrassment of the man who started the chicken and egg controversy, and for the sake of continuity, let us start with that "first word that is the last word,"—the "Management." For economic, geographic, and other reasons peculiar to "managements", they decide on a locality to be developed and ask the geological department for a report. The report considered favorably, the land and lease department acquires the prescribed acreage. Then the geological and engineering department cooperate for the establishing of "locations", whereat the producing department proceeds with the steps preliminary to production and finally presents a well to the pipe line department.

The pipe line foreman in charge of a field has a large responsibility. If his district lies up the weather channel he is expected to warn the dispatcher of approaching "Northers" and by strict adherence to pressure orders, aid in keeping an adequate supply at the city gate.

The necessity for great care in the matter of pressures is obvious, as the job of handling the dangerous high pressure well is not one for a novice, even aside from a supply standpoint. And as for the low pressure or suction, his cooperation is a big help to the compressor plant superintendent whose discharge pressure is subject to quick change. And a suction pressure in a proper ratio is highly conducive to economic and efficient compressor plant operation.

Naturally, cold weather operations would tend to keep the field man alert, but the summer by no means allows him a let down, as may be seen by our treatment of measurement.

Measurement: To discuss measurement as a means of arriving at a monetary value would be superfluous, therefore let us treat it from an ethical view point. We read a lot these days about the importance of creating and holding the good will of the consumers of natural gas, while very little attention has been given to creating and holding the good will of the well owners from which the gas is purchased. The independent producer has to depend on the pipe line companies to dispose of his gas, and is entitled to a great deal of consideration, since in quite a few instances he discovers the field originally, and has a considerable sum of money invested. In fields where the pipe line company owns some of the wells, it would be unjust to the independent well owners for the company to take as much gas as possible from its own wells, and merely make up the deficit from other wells, which would practically amount to shutting in the independent owners wells during the warmer months.

It should be the policy of distributing companies to take as nearly as possible the same percentage of open flow from each well in the same field, regardless of who owns the wells. The larger the open flow of a given well, the more the amount of gas taken, computed on a monthly basis. This applies also to wells owned by the company, and no discrimination should be made between these wells and those of the independent owners.

This becomes quite a problem during the warmer months of the year, when the demand is much less than during the colder period. For instance, in one field where a company is connected to approximately 60 wells with a total daily open flow capacity of more than two billion cubic feet, the daily demand was approximately 12 million cubic feet per day during the past summer, or less than one per cent of the total open flow. It was necessary to divide this amount between more than 60 wells, the amount allotted from each well depending on its open flow capacity. Each well was used for an average of approximately 32 hours per month, and when it is considered that a fairly constant pressure had to be maintained on the main line from the field one can imagine that the pressure men were kept fairly busy turning wells in and shutting them out.

There were two methods used to ac-

(Continued on Page 86)

CAN YOU READ YOUR METER?
He Will Show You
How to Read Your Meter
Booklets Will Be Mailed
Yours is Ready now
How to Read Your Meter
New Orleans Public Service Inc.
It's easy to read your meter
New Orleans Public Service Inc.

Large display advertisements in New Orleans dailys heralded the meter-reading school for customers of New Orleans Public Service, Inc.

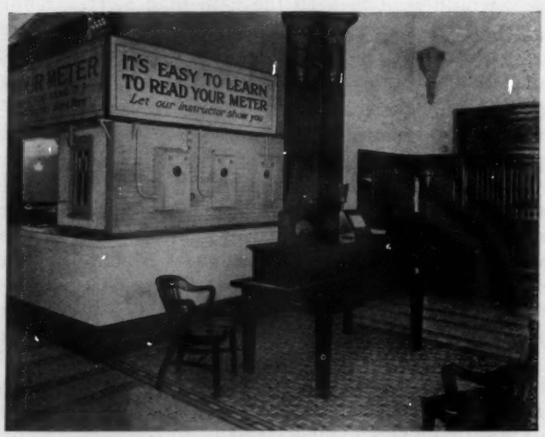
Meter-Reading Education *for the* Consumer: *an* Effective Good-Will Gesture

By J. C. Barnes
Director of Advertising
New Orleans Public Service, Inc.

IT is a well recognized fact that utilities can not prosper unless a spirit of mutual good will and tolerance is developed between the individual company and the customer. Just as the customer is dependent upon the utility for service, so is the utility dependent upon the customer for additional capital to maintain, construct, and enlarge its facilities.

A recognition of the necessity for this good will is often far easier than its realization. A utility company must ever be on its toes to foster, through institutional advertisements and generally pleasant public relations, this spirit of tolerance.

Admitting that a great part of the misunderstanding between company and consumer lies in the intangibility of the products sold, the New Orleans Public Service Inc. recently entered upon an elaborate and extensive plan of teaching its customers to read their meters, in the hope that by arming them with the knowledge of how to check the amount of gas and electricity consumed in a certain definite period of time, the possibility that they were paying for something they did not get would be eliminated.



In this booth on the first floor of the Public Service Building, New Orleans, was held the meter-reading school.

It therefore, becomes quite obvious that if every customer could check, each month, the amount of gas and electricity used in the same manner as he would check any other ordinary bill received, one of the greatest causes for misunderstanding would disappear.

Several weeks' time was spent by this company in a study of the most effective way in which to present this campaign of meter reading to the public. The first real step was the installation of a meter reading school on the first floor of the Public Service building. Model instruments, designed to simplify the teaching of meter reading, were installed. In charge of this instruction booth was placed an intelligent, affable, and well-trained meter reader, who had been featured before in various advertisements concerning meter readers' uniforms and badge numbers. The photograph here shows the set-up of the instruction booth, with the model instruments displayed. A large sign, "It's Easy To Learn To Read Your Meter," at the top of the side-wall of the booth was erected prominently so that the most casual observer upon

(Continued on Page 80)

An Intrinsic Property *of* Pipe Line Girth Butt-Welds

Discussion of Data on Residual Welding Stresses

By LLOYD T. JONES

Consulting Physicist
*Berkeley, California**

FOR REFERENCES SEE PAGE 56

THE researches on pipe-line stresses and pipe-line welding, which I have published[1] during the past few years, have once or twice contained a hint that there is an inherent stress in pipe-line, girth butt-welds that is not found in quite the same manner or degree in most other butt welds or in other forms of girth weld.

The pipe-line butt-weld has served faithfully during the transition period from the screw coupled and riveted lines to the continuous welded line. While there should be no hesitancy in changing the model of an inanimate form, it is with more than the usual reluctance that I point out a fault in a faithful servant.

My conclusions are based on the measurement of stresses and deformations in many welds that have come under my observation, and I express these thoughts only after having had them almost continuously in mind for several years. The fact that my conclusions are but the conclusions reached by a physicist on examination of accumulated data I shall plead as an extenuating circumstance in my treatment of the pipe-line, girth butt-weld.

The root of the evil lies in the shrinkage of the metal during solidification and cooling to air temperature. While expansion with rise in temperature is a property of metals that serves many useful purposes it can hardly be said to be a desirable phenomenon in the art of welding. It is this coefficient of linear expansion (or contraction) which makes it necessary for the welder, making a butt-weld in two flat plates, to separate the plates an extra amount at the end opposite the start of his weld and permit the plates to draw together as the welding proceeds.

In pipe-line welding, very unfortunately, it is not possible to arrange for a non-uniform spacing of the pipe ends at the start of welding and allow the spacing to become uniform during the progress of the welding. This robs us of one of the recognized methods of minimizing residual welding stress.

The production of a weld metal which has zero coefficient of expansion and is at the same time satisfactory as a steel would alleviate most of the difficulties that occupy our attention in this paper. The possibility of the production of such a metal seems very remote and I hold no definite hope that it will be produced, though metallurgical advance has been so rapid during the past few years that even a metal having this property may be in the offing.

In the average buried pipe line, whether it be for the transportation of water or gas, the temperature engendered stresses do not exceed 50 per cent of the strength of the plate of which the pipe is made. This is proved by the fact that a single row of rivets, which provides a girth joint of 50 per cent strength, is satisfactory in withstanding the stresses usually encountered during the laying and operation of a pipe line.

In the butt welding of the girth joints of the 65-inch x ½-inch steel pipe of the Mokelumne pipe line our attention was forcibly drawn to the fact that a butt-weld must provide an average strength far more than 50 per cent in order to provide the same freedom[2] from failure enjoyed by a 50 per cent riveted joint. The residual welding stress accounts for the difference. It is my intention to point out the peculiarities of residual welding stress in pipe-line, girth butt-welds.

Most welding engineers are, I believe, already aware that residual welding stress is not uniformly distributed throughout a weld, and some perhaps realize that in every pipe-line, girth butt-weld there are at least two points at which the weld metal is actually under compression[3]. Obviously at these points the weld will not likely fail, and we can then explain the well known phenomenon of girth welds failing for only a portion of the circumference and almost never a failure of the entire circumference of a welded joint.

Figure 1 shows the movement of the metal in a girth butt-weld in 65-inch x ½-inch steel pipe[4] that was subjected to simultaneous heating of the whole weld after the weld had been completed. This was done in an effort to allow the weld metal to elongate or contract in accordance with the residual stresses happening to be present and to make the magnitude of those stresses measurable.

Deformations are plotted radially, the width of the shaded area being the elongation or contraction of the weld metal according to the scale at the top. There are two well pronounced regions, top and bottom, in which the weld metal contracted on heating, showing that it had been under compression. There are two equally pronounced regions where the weld metal had been under tension. This weld was made by two men welding (not quite simultaneously) from the bottom to the top. The direction of progress of the welding is indicated by the arrows on the dotted circle, the beads on the circle showing the starting and finishing points.

The magnitude of the stress that may remain in a weld may readily exceed the elastic limit of the metal.

Let the circles of Figure 2 represent two girth butt-welds which will be made under the following procedure: In (a) suppose the upper and lower portions, indicated by the solid lines, to have been welded simultaneously and instantaneously. The residual stress in these portions will then be zero. If now the weld metal be deposited instantaneously in the portions indicated by the dotted lines these two portions will be in tension and the two parts previously welded will be placed in compression.

Deposition of weld metal requires time, but nevertheless the fabrication of a girth weld in this manner should (except in large diameter pipe) lead to two general regions of tension, two regions of compression and four neutral points where the residual stress is zero.

In (b) there are indicated by the solid lines four simultaneous deposits of weld metal. The later simultaneous welding of the four remaining portions should lead to four regions of tension, four of compression and eight neutral points.

I firmly believe that breaking a weld

* Presented before the Central Regional Conference of the Pacific Coast Gas Association, San Francisco, Calif., November 22, 1929.

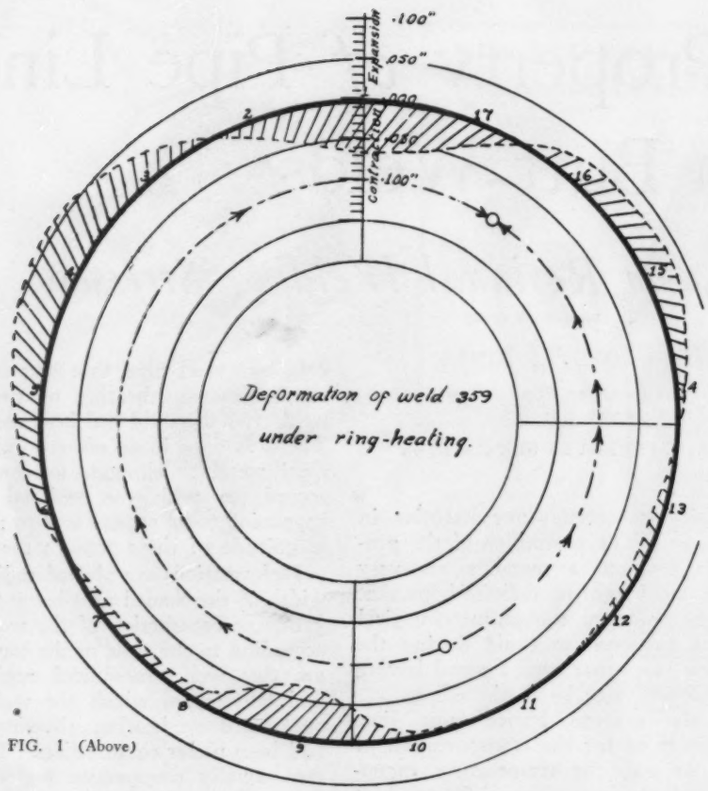


FIG. 1 (Above)

A weld in 65" x ½" steel pipe was brought to a red heat, the entire weld simultaneously, to allow the weld metal to relieve itself of stress and to show the location and nature of the stresses. Two regions contracted and two elongated.

up into many parts would lead to greatly reduced residual welding stresses. Unfortunately this form of construction is not always suitable.

During the welding of a pipe line of say 20 inches diameter it is customary to aline groups of about four sections each and have these three joints simultaneously welded by three welders, a helper continuously rolling the pipe. It is worth while to give a moment of consideration to the method of Figure 2-a in connection with the following thought. It may be suitable to have two welders simultaneously weld the two side quarters of each of the three joints in succession, then give the group a quarter turn and similarly complete the welds in succession. This will dispense with the helper who rolls the pipe and make it possible to assemble the group immediately above the ditch instead of beside the ditch.

Figure 3 shows the resulting deformations (plotted radially) in the welding of two "tie-in" butt-welds in 20-inch x 5/16-inch pipe. These welds were used to tie two groups into the line. The stresses introduced by the welding are quite independent of the fact that these particular groups were very large groups.

Through the kindness of Mr. R. V. Wilson of the Pacific Gas and Electric Company, I was afforded by only opportunity to make measurements on acetylene butt-welds in 20-inch x 5/16-inch pipe. Measurements were made continuously during the progress of the weld in an effort to determine the nature and location of residual stresses in tie-in welds and also in the usual rolling weld so well known in pipe line construction.

The charts of Figure 3 show only the total deformation and do not depict the rate of deformation, which will be done for the rolling weld.

In Figure 3-a two welders began at the bottom and welded simultaneously towards the top. The arrows at the bottom indicate the starting point and the direction of progress. The short, solid heavy lines along the circumference indicate the positions and lengths of the six tacks. These tacks failed entirely to prevent the closing of the weld gap. This is not intended to convey the impression that I deplore the use of such tacks. They serve a quite different purpose as well.

In Figure 3-b, the portion indicated by the solid line at the upper left had been previously welded. Note that this portion successfully withstood the compressing action (on it) of the newly deposited weld metal. I think there can be

(*Continued on Page 56*)

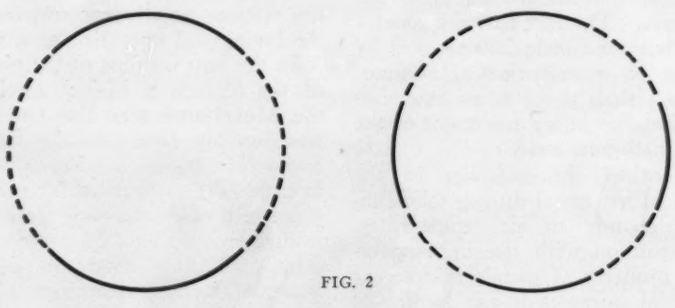


FIG. 2

a b

The circles represent two girth welds. The portions indicated by the solid lines are to be welded first and simultaneously, then the portions represented by the dotted lines.

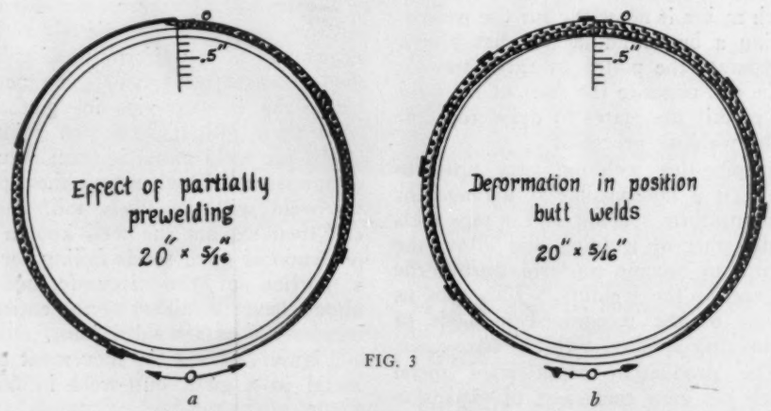


FIG. 3

a b

The deformations shown are the measured closing of the weld-spacing in two tie-in welds. In 3a the six tacks failed to prevent the closing. In 3b the portion at the upper left had been previously welded. This portion was not crushed.

Gas Is Superior in the

ROUNDHOUSE

Tests Show Fuel Savings Through Gas in Locomotive Pre-Heating

ABOVE: Firing a locomotive with gas in the Los Angeles shops of the Southern Pacific Railroad, on the lines of the Los Angeles Gas and Electric Corporation. About 10,000 cu. ft. an hour is used in getting up steam for each engine. Illustration courtesy of Los Angeles Gas and Electric Corporation.

By FRANK JACKSON
Industrial Engineer
Fort Worth Gas Company

IN THIS period of rapid change of method and the discarding of that which has been regarded as orthodox, we realize more fully that the "unusual" must be given stricter attention and true values determined lest we fail to claim that which is rightfully our own in gas fuel application.

Frank Jackson

It being the purpose of the gas industry to advance the use of its product to the greatest possible extent, it is essential that ever greater elasticity of thought be given to the various applications to which this fuel may be placed; this in addition to more efficient use in those fields already established.

Of recent years gas has found increasing favor in a variety of railway shop uses. Among the "common" applications of gas fuel in railroad work we have such menial tasks as the heating of furnaces, forges, tire shrinking on locomotives, keeping soldering irons aglow, heating the roundhouse, keeping passenger coaches warm and in readiness for their run, etc.

At one period, not long ago to most of us, they of the old school declared distillate or kerosine the fuel for locomotive tire work; coal or coke for the furnaces, forges, and heating of the roundhouse, and fuel oil for the stationary boiler. Gas properly has displaced these fuels in their respective order, as the advantages of greater speed, economy, cleanliness and sanitation involved in gas use, with the attendant greater thoroughness of operation, have been established in the minds of those who captain the railroad industry.

Another use of gas which is destined shortly to replace fuel oil in those roundhouses fortunate enough to be in proximity to this better fuel is that of preheating or firing up locomotives in the roundhouse. While gas is serving in this capacity at a few points, it is felt that this industrial load may be escaping attention in other sections.

Through the courtesy and cooperation of one of the major railroads, whose name for the present will be withheld, the writer was enabled to thoroughly test out this application of gas in locomotives, ranging from the smallest switch engine and small passenger type to those giants of the most powerful type used in long haul freight and passenger service.

This pre-heating or steaming up of locomotives is first and last not a locomotive but a stationary proposition—an industrial process, with gas emerging as the most ideal fuel both on a basis of initial fuel cost and on time and labor involved. When properly applied, gas fuel is far ahead of oil for this purpose and each road is to be considered a likely prospect as the resistance to the "new" idea is removed by the march of progress.

After each locomotive has been overhauled and the inspector has given it his "O.K" it is ready for removal from the roundhouse, first being steamed up, and is run outside under its own steam, there to remain until ready for its respective run.

While out on its run a steam coil supplies heat to the fuel oil to keep it of proper consistency. In addition to this the train's motion keeps this oil well agitated. In the shops this condition is reversed. While the mechanics are putting the locomotive in trim the oil ordinarily is allowed to cool, and in addition the heavier ingredients and water (which is usually present) settle to the bottom of the tank.

This is the condition the "fire-builder" usually meets when he takes charge, lights his fire after the overhauling, and gets up steam in readiness for the hostler to take the engine out of the roundhouse. Due to the sluggish oil encountered; to water in the fuel; variance in pressure of the atomizing medium, whether steam or compressed air; or an occasional slug of water coming through with same, one may see the fuel oil stream down into the pit and either burn out at that point, adding to the fuel loss and the already heavy smudge in the roundhouse—or the water hose is called into service (waste of water and time) and the oil is washed away into the sewer, to become either a fire menace down the line or bring the railroad a summons from the courts for

pollution of streams adjacent to the railroad properties.

In cooler weather this trouble is magnified greatly, it being a common occurrence for the fire to go out after lighting a cold furnace, allowing probably several barrels of oil to run down the pit before being detected by the fire builder, or while he is striving to make his fire "take hold."

A description of two tests on fuel oil and two on natural gas fuel will suffice to acquaint the reader with the manner in which these were conducted and with the results obtained.

Meters used: Two large displacement meters with combined volume and pressure gauges.

Approximate B.t.u. content of gas: 1,000.

Gas pressure available at regulator: 15 pounds.

TABLE NO. 1. TEST ON SMALL LOCOMOTIVES

	Natural Gas Fuel	*Oil Fuel*
Railroad	.....	.....
Located at	Fort Worth	Fort Worth
Locomotive number	.....	.....
Service	Switch engine	Switch engine
Water temperature	70 Deg. F.	70 Deg. F.
Time fire lighted	1:25 P. M.	10:10 A. M.
Time fire out	1:52 P. M.	11:05 A. M.
Duration of test	27 minutes	55 minutes
Steam gage pressure (start)	None	None
Steam gage pressure (finish)	100 lbs.	100 lbs.
Total cu. ft. gas	5880	.....
Total gals. fuel oil	.....	60
Gals. in gas equivalent	41.16	.....
Air pressure on atomizing line	None	90 lbs.
Air pressure on blower	90 lbs.	90 lbs.
Temp. fuel oil	.....	95 Deg. F.

Remarks:

One gas burner used on test. Placed in front firing door of locomotive.
One gage water at start of both tests.

Summary:

Total gals. fuel oil to build 100 lbs. steam pressure	60.00
Total equivalent natural gas for same	41.16
Saving on above locomotive with gas fuel (gals. oil)	18.84

TABLE NO. 2. TEST ON LARGE LOCOMOTIVES

	Natural Gas Fuel	*Oil Fuel*
Railroad	.....	.....
Located at	Fort Worth	Fort Worth
Locomotive number	.....	.....
Service	Freight	Freight
Water temperature	140 Deg. F.	145 Deg. F.
Time fire lighted	3:30 P. M.	2:30 P. M.
Time fire out	4:15 P. M.	3:23 P. M.
Duration of test	45 minutes	53 minutes
Steam gage pressure (start)	None	None
Steam gage pressure (finish)	100 lbs.	100 lbs.
Total cu. ft. gas	9922	.....
Total gals. fuel oil	.....	80
Gals. in gas equivalent	69.426	.....
Air pressure on atomizing line	None	90 lbs.
Air pressure on blower	90 lbs.	90 lbs.
Temp. fuel oil	.....	90 Deg. F.

Remarks:

Two gas burners strapped together and placed in front firing door of locomotive.
One gage water at start of both tests.

Summary:

Total gals. fuel oil to build 100 lbs. steam pressure	80.000
Total equivalent natural gas for same	69.426
Saving on above locomotive with gas fuel (gals. oil)	10.574

Pressure at Burner: Not known.

Line to burner consisted of 2-inch pipe to within 15 feet of locomotive cab. Two-inch flexible metal-covered hose 25 feet in length completed the line to the burner, which was attached to hose, passed through cab entrance, placed in firing door and lighted, the flame being increased in volume while the blower was being opened to stack.

The burner chosen for this purpose was the style "J" A.V. Gas Burner, manufactured by the A. V. Burner Company at Fort Worth. This burner was chosen because back-firing is made impossible on account of the arrangement and location of the orifices and the fact that it will operate successfully without baffle walls when a long flue travel is required, which is the case with the locomotive boiler.

Another feature of this burner making it ideal for this test is its octagonal shape, permitting the ready installation of several units in firing doors of various widths and heights. Tests in which one and two "J" type burners were used showed efficiency each way. The size of locomotive fired determined the use of one or two units in the operation.

In either case the burner or burners are merely placed in the fire box door and the fire lighted—an operation consuming not over a minute or two at the most. The elimination of a "cold" or "dead" spot in the flame of the burner is assured by its design.

Burner size: 8-inchx8-inch.

Number and size orifices: Twelve ⅛-inch and four 5/64-inch.

Table No. 1 and Table No. 2 give comparative data on tests with gas and with fuel oil run on small locomotives and large locomotives respectively.

Further inducements to the use of gas in this operation may be mentioned. For instance:

No preliminary arrangements with attendant labor losses are called for in gas firing.

There is no wastage of labor, time, or fuel, due to foreign substances or water in fuel oil, or to fuel becoming chilled and sluggish, the latter condition being particularly noticeable in cool weather.

Cleanliness of operation is assured. There is no "fogging up" of the roundhouse during steaming periods.

With the cold locomotive and with a cold fire box, steaming is achieved more readily with gas fuel than with oil fuel when fire box is hot.

It is possible that this locomotive load is the needed link to attach the railroads to the gas line in some sections due to

(Continued on page 61)

Utilizing Propane *and* Butane

Liquefied Petroleum Gas as an Enricher for Blue Gas in Place of Gas Oil

By E. L. FISHER

The United Light & Power Engineering & Construction Company, Davenport, Iowa.

PROPANE and butane, liquefied petroleum gases obtained in the course of natural gasoline manufacture, are receiving increasing attention from gas men. These products may be put to four principal uses in the gas industry:

1. As a carburetting material in place of gas oil.

2. In meeting peak loads.

3. As town gas, served from central storage plants; or served to isolated consumers from individual storage units.

4. On branch feeder lines to make up B.t.u. losses in compression and condensation.

In his discussion on these pages the author treats of the first phase, on the basis of extensive experimentation conducted by his company in cooperation with the U. S. Bureau of Mines and the research department of the Phillips Petroleum Company. Following development of apparatus, and small scale experiments, a year's trial operation of the Davenport, Iowa, plant was undertaken by the methods described herein. This trial period has been extended for a second year, to further determine the economic limits of the process.

All data which relate to use of these liquefied petroleum gases as enriching mediums merit close observance, and Mr. Fischer's discussion, which formed a part of the 1929 report of the American Gas Association's subcommittee on Utilization of Propane and Butane in the Gas Industry, should command much interest.—EDITOR.

IN the spring of 1927 we were approached by Mr. W. W. Odell of the Bureau of Mines on the subject of using Liquefied Petroleum Gas as an enricher for blue gas instead of gas oil which is commonly used for that purpose. Mr. Odell, in conjunction with the research department of the Phillips Petroleum Company, had previously spent some time on the problem of utilizing the hydrocarbons resulting as a byproduct of extracting natural gasoline from natural gas. These hydrocarbons consisted principally of butane and propane, the characteristics of these gases being such as to prevent their being retained in the natural gasoline, owing to their high volatility and to prevent their being retained by the natural gas at the high pressures existing in the natural gas transmission systems.

We first started experimenting with about a 50 per cent mixture of butane and propane, mixing this with blue gas in small experimental holders, to determine what sort of gas might be produced and how it would act. We found the 50 per cent mixture of butane and propane to have certain characteristics which were not desirable and obtained instead a practically pure butane material, which material is now known as the Phillips Petroleum Company's G-4 Grade of Liquefied Petroleum Gas. Its average constituents are about 93 per cent butane, 5 per cent propane and 2 per cent pentane. After conducting these laboratory experiments, we were especially interested to try the production of gas on a larger scale, approaching actual operating conditions. We therefore made a mixture of blue gas and G-4 material of about 60,000 cu. ft. This was done at the Moline, Illinois, gas plant, utilizing a spare holder at that place. This gas was burned in a boiler at Moline Power House, a recording calorimeter being placed on the line between the holder and the boiler to determine the B.t.u. of the gas as it was being used. This test being successful we decided to try the actual use of the G-4 material for enriching the regular city supply of gas. For this experiment we decided to work at one of our smaller properties where the quantities involved would not be so large and where the material could be used directly from the tank car in which it was shipped. The experiment was accordingly made at the Muscatine, Iowa, gas plant during the summer of 1927. The quantity of gas oil was gradually reduced over a period of about 10 days, finally discontinuing the use of gas oil entirely and making straight blue gas in the water gas set and operating on full butane carburetion for a total of six weeks.

The result of the experiments at Muscatine were such as to lead us to believe that very few difficulties would be encountered by the use of G-4 material in this manner, and the only question left open to be determined was whether or not the use of this material for enriching blue gas was economically feasible. We recognized early that most economical results could be obtained from this method of operation only by the use of a plant equipped with waste heat boilers so that the heat which formerly had been utilized for cracking oil in the carburetter, and which was not required in the blue gas operation, could be utilized in the production of steam. We, therefore, determined that for our prolonged experiment as to the financial feasibility of this method of gas production that we would operate at our plant at Davenport, Iowa, which was already equipped with both blast and illuminating gas waste heat boilers. Arrangements were made for a year's operation in this manner, the operation to be considered entirely as a trial proposition. This trial period has now been extended for another year.

During the early part of 1928 the necessary butane storage tanks and equipment were installed so that the experiment could be carried on. Operation of butane enrichment commenced on April 9, 1928. Since that time we have been operating the gas plant at Davenport with full butane carburetion except for certain short periods due to lack of sufficient car equipment, when our supply of butane was exhausted.

Before going into the matter of equipment necessary in this method of using butane, we believe that to give you some idea of the physical properties of the material and a brief statement of how it is obtained and why it is available for use will enable you to better grasp the arrangements that we have worked out for its use and the way it may be expected to act under various conditions.

You have no doubt all heard the term "casing head" gasoline and know that it is gasoline which has been extracted from natural gas. It received its name originally from the fact that gasoline was obtained only from natural gas which came from the casing of an oil well and was therefore rich in gasoline

hydrocarbons. This gas was taken from the head of the oil well casing and consequently the name "casing head gas" or "casing head gasoline." The art of extracting gasoline from natural gas has now progressed to the point where not only the casing head gas but all natural gas is usually subjected to the stripping process whereby the gasoline is extracted before the gas is piped to cities and towns for consumption. The term "casing head gasoline" has therefore given way to the term "natural gasoline."

The natural gasoline is removed from the natural gas largely by what is known as the absorption process. This process consists of washing the gas with an inert oil. This oil, being of very low volatility and very high absorbing qualities, absorbs all of the heavier hydrocarbons from the natural gas, so that when the natural gas leaves the absorber it contains no hydrocarbons heavier than ethane. These heavier hydrocarbons, consisting of propane, butane, pentane, hexane, etc., are carried in the wash oil or absorbing medium and are subjected to distillation. By this distillation process the hydrocarbons contained in this absorber oil may be separated out in a comparatively pure state. The hydrocarbons heavier than butane, namely pentane, hexane, etc., are liquid under ordinary temperatures and pressures and are retained as natural gasoline. The propane and butane, however, will not remain in the liquid state under normal pressure and temperature conditions, and are therefore not salable as natural gasoline. In the earlier days of the natural gasoline industry when gasoline was being obtained from petroleum oils by distillation only, all of the butane and some of the pentane content could be utilized by blending the natural gasoline with gasoline from the distillation process, using some of the heavier product such as kerosene, etc., which would help to hold the butane in solution. In fact the motor fuel production plants were desirous of obtaining this high volatile natural gasoline so that they could make a larger proportion of the kerosene content into motor fuel. Since the cracking process has been discovered, however, a large amount of gasoline is being produced from heavier grades of petroleum oil, that is, gas oil and fuel oil, by this process. This process also results in the production of the lighter hydrocarbons, such as butane, propane, etc., so that the gasoline so produced already contains as many of the lighter hydrocarbons as can be retained in the gasoline and the refiners have accordingly required that the natural gasoline producers eliminate these higher hydrocarbons from the natural gasoline which they purchase for blending with refined gasoline. The result is that large quantities of butane and propane are available as by-products of the natural gasoline industry. Some idea of the large quantities of butane and propane available may be obtained by quoting from the paper of Mr. R. W. Thomas of the Phillips Petroleum Company which was presented before the American Gas Association at the 1928 convention at Atlantic City. We quote as follows:

"It may be surprising to note from column four that since 1922 over 10% of our total motor fuel has been composed of natural gasoline. It is apparent, from an inspection of column five, that natural gasoline production is growing more rapidly than that of crude oil. Fig. 4 presents this fact graphically. Inasmuch as liquefied petroleum gases are derived from a very rapidly mounting supply of natural gasoline, it is obvious that ample quantities of commercial propane and butane will be available as long as crude oil, motor fuels, and lubricants are available. A single company, having a natural gasoline production in excess of 500,000 gals. per day, has in addition a potential daily supply of over 500,000 gals. of commercial propane, 350,000 gals. of commercial butane, and corresponding amounts of the heavier paraffins.

It is estimated that the entire petroleum industry has a potential production of more than ten times the amounts stated above. On a thermal basis, therefore, the industry has available quantities of these materials equivalent to 1,500,000,000 cu. ft. of manufactured gas per day. This is more than the entire consumption of manufactured gas in 1927."

Some of the most important physical properties of the G-4 material are:

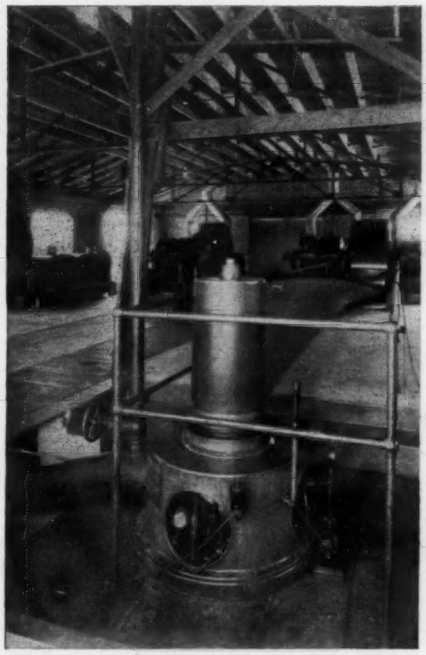
Weight per gallon of liquid 4.8 lbs.; B.t.u. value per gallon of liquid 102,400; latent heat of vaporization per gallon of liquid 830 B.t.u.; volume of gas produced on vaporization of one gallon of liquid 32 cu.ft. at standard conditions; specific gravity of this gas referred to air 1.95; B.t.u. value of gas per standard cu.ft. 3,200; boiling point of the liquid at atmospheric pressure 15° F.; vapor pressure at 70° F. 33 lbs. per sq.in. gauge.

To visualize the action of this material under various conditions, let us compare it to water. Assume that we have a pressure vessel or tank partially filled with water, and that this tank is surrounded by an atmosphere at a temperature of something greater than 212° F., that is, above the boiling point of water. Let us further assume that the air has been evacuated from the space above the water in the tank and that this space is filled with water vapor or in other words steam. Now it will readily be seen that the pressure existing inside of the tank will depend entirely upon the temperature of the water. From steam tables we could readily determine the pressure in the tank if we knew the temperature of the water inside of the tank and we know that this condition would be continued as long as the water was at that temperature. Now let us assume further that we start drawing steam from the top of this vessel. The effect is of course to lower the pressure inside of the vessel and in turn to start the water to boiling. The boiling of the water will tend to lower the temperature of the water and consequently lower the pressure inside of the tank. As soon as this action starts, heat will flow from the surrounding atmosphere through the walls of the tank into the water and thus tend to continue the boiling action. If the temperature outside of the tank were maintained at some temperature above boiling so that the latent heat of vaporization were supplied by a transfer of heat from the surrounding atmosphere to the water in the tank, all of the water in the tank would eventually be evaporated and the pressure which would be maintained in the tank would be directly in proportion to the temperature of the water which in turn would be determined by the rate of heat transferred from the surrounding atmosphere to the water.

The condition of butane liquid stored in a pressure tank is exactly similar to the analogy given above. The boiling point of the liquid is 15° F. The normal atmospheric temperature surrounding this tank is higher than 15° F., so that as fast as we remove gas from the top of the tank the butane liquid will boil and continue to boil as long as its temperature is above 15° F. and the pressure in the vessel is less than the vapor pressure of the butane corresponding to its actual temperature.

Let us assume now a different case, in which the butane liquid is allowed to flow from the tank, the condition as to temperature being maintained: a pipe connection into the liquid space and connecting to atmosphere or into another tank will cause liquid to flow from the tank to outside atmosphere or to the other tank in which the pressure is less than that of the first tank. As the liquid is removed from the first tank by this method, it will be seen that sufficient additional liquid will vaporize to fill the space in the tank which was originally occupied by the liquid, and that the pressure in the tank will be maintained without change so long as there is no change in temperature in this tank. As soon as all of the liquid has been removed from the tank, the tank will still be filled with gas at a pressure corresponding to its temperature. If then we have a connection from this tank to another vessel such as a holder, gas will be transferred from the tank to the holder until such time as the

(Continued on Page 57)



Deep well turbine pump installation driven by 400-H.P. natural gas engine, pulling water from 300-foot level for Azusa Irrigation Company, on the Southern Counties Gas Company southern California system.

Gas Engines Won This Load *on* Economy

By E. B. MOREY

Industrial Engineer, Southern Counties Gas Company
*Los Angeles, California**

THE lifting of 350 miner's inches of water, or 2,250 gallons per minute from a 300-foot underground water level to an elevation above ground of 150 feet, through five miles of pipe line, for the Azusa Irrigation Company, of Azusa, California, became a power cost problem of considerable magnitude. Its solution added a desirable consumer to the lines of the Southern Counties Gas Company.

This gas power selling problem became more difficult because of the highly competitive factor, due to the customer having in use a comparable total horsepower of electric motors and natural gas engines, thus enabling both utilities to figure in the lowest blocks of their respective large consumers schedules.

To contemplate the installation of natural gas engines entailed an enormous investment, as compared with electric motor power; virtually 500 per cent more, hence the gas company's need for carefully computing the actual power cost and its reaction on the water costs, over a period of time, in order to show a reasonable saving to offset the added investment, engines vs. motors, of about $20,000.

POWER UNITS AND OPERATING TIME

The water horsepower to deliver approximately 10 tons of water every 60 seconds against a 450-foot total head, computed through pump efficiencies, called for 551 B.h.p. or 600 h.p. connected. Load was divided proportional to lift, or 400 h.p. for the deep well pump and 200 h.p. for the booster pump.

Each complete unit being dependent upon the other for water delivery, the entire plant operating time in h.p. or k.w. hours was based on the full connected and input load, for the irrigation season, conservatively figured as six months per annum.

COMPARATIVE POWER COSTS

This resolved itself, briefly, into the following consumption comparisons:

Electric Motor Power

456 K.W. x 730 hours equals 332,880 K.W. hours per month

332,880 K.W. Hours @ $0.128 equals $2,658.48 per month, or

1,997,280 K.W. Hours for six months costing $15,950.88

Gas Engine Power

551 H.P. x 730 hours equals 402,230 H.P. hours per month

402,230 H.P. hours equals 4,022 M. cu. ft. of gas

4,022 M. cu. ft. @ 25c equals $1,005.50 per month, or

24,132 M. cu. ft. in six months costing $6,033.00.

SAVING DUE TO GAS

The gross difference between electric and gas per annum came to $9,917.88. The net difference after allowing for attendance, lubricating oil, and fixed charges, reduced this to $7,068.33, or sufficient to off-set, in three years time, the total added investment of over $20,000.00, thus returning in excess of 33-1/3 per cent on the investment, plus the engines and equipment, from money which would otherwise have been spent for power only.

In addition to the monetary gain, through the use of gas engine power, the customer received the benefit of more flexible power drives, very desirable for increasing or decreasing pump speeds, not available with constant speed motors; likewise, increased ability to deliver water at varying head pressures.

GAS CONSUMPTION

Gas consumption at this plant averages about 5,000 cu. ft. per hour, day and night, thus adding a fine off peak summer load for this district.

The engine units installed consist of a 400-H.P. natural gas engine, driving a deep well turbine pump by means of a 36-inch 3-ply leather belt over a quarter-turn, ball bearing idler. A 200-H.P. similar engine drives a 2-stage horizontal, centrifugal booster pump over a 20-inch double leather belt and single ball bearing idler, and the entire plant is outstanding among California irrigationists because of its size and economical operating costs.

*A comtribution to the report of the Pacific Coast Gas Association's 1929 Committee on Industrial Gas Sales—Natural Gas, of which E. M. De Remer of the Southern California Gas Company was chairman.

LONE STAR BUILDS LINE TO CENTRAL TEXAS TOWNS

Lone Star Gas Company, of Dallas, has begun the construction of a 25-mile, 4-inch gas line, from a point on the company's line serving Abilene, extending southward to Buffalo Gap, Tuscola, Ovalo and Lawn. Gas is expected to be served the towns about February 1. The city distribution plants are being rushed to completion by the Community Natural Gas Company, an affiliated company of the Lone Star.

Gas has recently been turned on by the Community in Seagoville, Crandall, Athens, Kemp, Mabank, Malakoff, Chilton, and Chico in Texas. Franchises are held in Streetman, Deport, Allen, Melissa, Pecan Gap and Blossom, where the new fuel is expected to be supplied in the early future.

Whoopee-e . . . with a Sells Gas

2,554 Ranges Placed System by an "Old

The wild, wild West supplies the dominant note for this display, used by the Atlanta Gas Light Company of Atlanta, Ga.

THE Southern Cities Public Service Corporation, with headquarters in Atlanta, Georgia, owning and operating properties throughout the South recently carried through a highly successful range campaign extending for a full month. A word that has newly come into its own describes the dominating element which made this sales drive different . . . *whoopee!* The "whoopee" motif made the Southern Cities effort unique—in publicity, exploitation and results—and hence the following detailed review of methods used is offered *Western Gas* readers.

Twenty-six properties put on this sale simultaneously, in these communities: Atlanta, Athens, Augusta, Brunswick, Charleston, Concord, Gastonia, Griffin, Macon, Rome, Valdosta, Waycross, Anniston, Decatur, Hattiesburg, Huntsville, Montgomery, Meridian, Pensacola, Selma, Tuscaloosa, Columbus, Mobile, Port Arthur, West Palm Beach and Key West. This is the first time that so large a group of properties had used the mass idea in advertising, merchandising and exploitation in the South.

The results definitely prove that "circus methods," used in connection with a well planned and engineered campaign will attract public attention, create enthusiasm among managers, sales executives and salesmen, pay big dividends in names on the dotted line.

A. C. Crandall, general commercial manager and his assistant, G. J. Kollock, started working on details of this campaign nearly three months before the campaign was due to get in motion. They planned a budget, mapped out advertising, and decided upon a feature range and the prices and terms for its sale. It was decided, particularly on replacement sales, that the better class of ranges rather than the cheaper specials that are often featured in range campaigns, would be pushed. The Roper, three-quarter enamel, oven control range which was featured was priced at $99.50 cash or $104 on time, and $13.15 was allowed for any old stove. The terms were $1 down, balance payable in 12 months.

While this range was the one featured in the advertising, less expensive ranges were sold. On ranges running from $50.00 to $75.00, $8 was allowed for any old stove; on ranges from $75 to $100, exclusive of the feature range, $10 was allowed; on ranges over $100, $12 was allowed. The idea in this was to encourage the purchase of better class ranges. Instead of allowing a greater allowance for more expensive merchandise than the feature range, only $12 was allowed. In spite of this fact a great number of expensive ranges were sold.

Three weeks prior to the campaign Mr. Crandall issued a very complete bound pamphlet giving advertising copy, suggested budget arrangements and suggested tie-ins to all managers. The advertising could be changed to suit local conditions of the various cities running the sale. Bandanna handkerchiefs were sent to all properties for distribution to youngsters who visited the various display rooms with their parents. These were imprinted "Round Up Campaign." A direct-mail letter, very carefully worked out, was sent to nearly every prospect. Special leaflets were sent out with the bills. A week prior to the starting of the compaign, R. C. Hoffman, Jr., vice-president of the Southern Cities, called a staff meeting of his division managers. W. W. Winter, general manager of the Western Division, was made boss of the Western Division cow camp and his assistant, E. J. Stern, was made top hand. M. L. Kane was made boss of the Atlanta Division with Howard Bowman as top hand. J. W. Gates, general manager of the Eastern Division, was made boss of that camp and Wm. F. Eve, Jr., top hand.

At this meeting, details were carefully gone over and nothing was left to chance in seeing that everyone understood the complete set-up.

There was considerable chance in this campaign for ingenuity to be displayed by the various managers. Without exception, those properties that

Western Flavor Ranges in the *Old South*

on a 116,400-Meter Stove Round-Up"

In Mobile this mule-cart combination toured the streets with great success, attracting notice to the "old stove round-up"

went whole-heartedly into the circus side of this enterprise, had the best results. Some of the interesting tie-ins that were used are discussed below.

In the Western Division, Mr. Winter and Mr. Stern purchased a five gallon hat. The manager of the property in this division selling the fewest ranges each week had to wear the hat the following week, have a photograph of himself taken wearing it, and send the photo to all the managers in that division. No property in his division kept the hat over one week.

In Mobile, where a really remarkable record was made (sales ran 315 ranges for 7,500 meters), many publicity stunts were used. One which was very effective was the securing of a mule and cart as illustrated with this article. This was a big hit with the children, who in turn called it to the attention of their parents.

In Montgomery, Alabama, H. W. Gee, manager, secured a man 6 feet, 3 inches tall and equipped him with a horse and cowpuncher's outfit, and placarded him, advertising the Old Stove Round Up. This cow puncher punched for about three days and then evidently the call of the west got him, for when last seen he was 22 miles on the road to Selma, Alabama. This tragedy was turned to good account by a front page story in the local papers and Montgomery made what appears to be an all time record for sales per meter of properties this size by selling 184 ranges for 4,014 meters. An average net selling price after deducting trade-in was $67.77.

At Anniston, Alabama, Graham Kirkpatrick, manager, actually piled a load of old stoves in the gas company window and then secured an animated poster cut-out, which, in conjunction with an electric motor, gave a realistic exhibition of bronco-busting, and attracted wide attention.

G. H. Hilliard of Tuscaloosa, Alabama, with 1,700 meters sold 54 ranges at an average of $81.92.

In Atlanta, M. L. Kane and Howard Bowman, with the help of J. M. Johnson, their window dresser, had very attractive windows and also went into the cartoon field. During the last week of the sale they got an antiquated wagon and two mules and loaded this up with old stoves. Some of the service men were good horseback riders and this combination toured the city. Incidentally, a picture of this feature made the two evening papers and was a good tie-in for publicity. Atlanta sold 1,058 ranges.

In Charleston, S. C., Charles Lyons, manager, engineered the sale of 108 ranges in what is probably the slowest time of the year for a city not notorious for its bustle at any time of the year.

The little town of Brunswick, Ga., with 1,100 meters actually sold 44 ranges at an average selling price, after deducting trade-ins, of $100.66. W. D. McArthur is manager of this property.

In Macon, Ga., with approximately 7,000 meters and following immediately upon a clearance sale, 174 ranges were sold by Whoopee methods. Chas. Leach, manager, had very attractive windows and the last two days of the sale erected a gas torch over a large electric sign on the building, served refreshments, and stayed open evenings.

This sale is remarkable in that it was a replacement sale and in most of the properties there had been very good business right along. Very few ranges were sold on new extensions, as most of the managers wished to reserve the sale of appliances in these extensions for later in the year. The month of selling by Circus methods and systematic preliminary planning and organization caused the following record:

For a total of 116,400 meters 2,554 gas ranges were sold at a net selling price after deducting the trade allowance, of $192,000.94. Had this sale been figured as are many sales, on the gross amount of the ranges, approximately $25,000 could be added to the figures arrived at. The net average of

(Continued on page 52)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California
A Department Conducted by Clifford Johnstone, Managing Director

Pacific Coast States Show Highest Rate of Growth in Past Year

THAT the year 1929 has been a prosperous one for the gas industry is shown by a recent statistical bulletin of the American Gas Association.

This indicates that the gas industry as a whole has had a gain of 2.4 per cent in consumers for the year ending September 30, and a 9.4 per cent increase in gas sales for the first 9 months of 1929 over a similar period of 1928. An increase in revenue of 4.5 per cent is shown.

This same report shows the Pacific Coast states as having had a rate of growth higher than the national average with the exception of increase in consumers. Customers increased only .5 of 1 per cent, but gas sales increased 19.7 per cent, and revenue 10.4 per cent.

This indicates a healthy growth in sales per customer and reflects the substantial rate reductions which have been made by several companies this year.

Preliminary figures compiled in the office of the Pacific Coast Gas Association indicate that the gas industry of the Pacific Coast, in which we include British Columbia, Washington, Oregon, California, Arizona, Nevada and Idaho now have some 21,600 miles of main, and employ 11,600 people, with an annual payroll of close to $20,000,000. These gas companies serve more than 1,500,000 customers, and will sell to them in 1929 nearly 130,000,000,000 cubic feet of gas, most of which is natural gas of over 1,000 B.t.u. heat content.

The gross revenue for the year will be close to $70,000,000.

While it is difficult to estimate the gas appliance sales made in this territory, they will approximate 100,000 gas ranges, 60,000 water heaters, 110,000 space heaters, 20,00 gas-fired furnaces, and 350 gas-fired boilers.

The gas industry is a big business and a useful business, and those of us who are connected with it can feel justly proud of our year's record.

Mid-Winter Meetings of Technical and Commercial Sections in February

BOTH the Technical and Commercial Sections will hold Mid-Winter conferences in Los Angeles in February, the Commercial meeting coming on February 6 and 7, and the Technical meeting on February 20 and 21.

Frank Weiss, new business manager of the Los Angeles Gas and Electric Corporation and vice-chairman of the Commercial Section, will be in charge of the Commercial meeting, and William Moeller, Jr., manager of natural gas production and transmission for the Southern California Gas Company and chairman of the Technical Section, will preside at the Technical meeting.

The purpose of these meetings is to discuss the problems facing the industry in the spheres handled by these Sections and to consolidate the work which Section committees are doing, so that the member companies of the Association may again be assured of an excellent series of informative and up-to-the-minute reports.

Notices will be sent out from the Association office concerning the programs of these meetings.

Volume 20 of Association Proceedings

VOLUME 20 of the Association's Proceedings, covering the work done during the fiscal year which ended in September, 1929, is about ready for the press and should be available for distribution to Association members some time during January.

Volume 20 will be a book of over 650 pages and is without question one of the most informative books ever published by the Association. It is sent free to all members of the Association and sold to outsiders at $5.00 per copy.

Remember These Dates:

Feb. 6-7:
Mid-Winter Conference, Technical Section, at Los Angeles.

Feb. 6-7:
Mid-Winter Conference, Commercial Section, at Los Angeles.

June:
Northern Regional Conference, at Seattle.

Sept. 9-13:
Thirty-Seventh Annual Convention, at Pasadena, Calif.

Production Committee

W. A. BAHR, Chairman of the Production Committee, lists his committee personnel for the year, as given below:

W. A. Bahr

REFRACTORIES

T. N. Kellett, Chairman, Los Angeles Gas & Electric Corporation.

F. M. Cota, San Diego Consolidated Gas & Electric Co.

A. E. Hall, Coast Counties Gas and Electric Company.

J. K. Lehman, Portland Gas and Coke Company.

COAL AND WATER GAS

W. H. Dreaper, Chairman, British Columbia Electric Power and Gas Co.

F. C. Hawks, Washington Gas & Electric Company.

R. A. Hoffman, Spokane Gas and Fuel Company.

J. F. Sauer, Pacific Gas and Electric Company.

NATURAL GAS ODORANTS

Lee Holtz, Chairman, Southern California Gas Company.

P. E. Beckman, Pacific Gas and Electric Company.

I. C. Hocker, Northwest Cities Gas Company.

C. E. White, San Diego Consolidated Gas and Electric Company

ORGANIC SULPHUR

V. H. Halstead, Chairman, San Diego Consolidated Gas & Elec. Co.
D. R. Hiskey, Southern California Gas Company.
S. C. Schwarz, Portland Gas and Coke Company.

PLANT HOUSEKEEPING

A. E. Englebright, Chairman, Pacific Gas and Electric Company.
A. M. Riesen, Pacific Gas and Electric Company.

CORROSION OF GAS PLANT EQUIPMENT

F. C. Hawks, Chairman, Washington Gas and Electric Company.
A. E. Hall, Coast Counties as and Electric Company.
B. G. Dick, Portland Gas and Coke Company.

GAS PLANT WASTE DISPOSAL

N. H. Wardale, Chairman, Portland Gas and Coke Company.
J. A. Harritt, San Diego Consolidated Gas and Electric Company.

In addition, Frank Wills, of the Pacific Gas and Electric Company, will write a paper on the results achieved by his company in reforming natural gas.

Distribution Committee

W. M. HENDERSON, chairman of the Distribution Committee, announces the following line up of committee workers on distribution projects:

METERS

Ottto Goldkamp Chairman, San Diego Consolidated Gas & Electric Co.
Fred Coble, Southern California Gas Company.
Richard Crawford, Los Angeles Gas & Electric Corporation.
D. E. Farmer, Portland Gas and Coke Company.
E. E. McInnis, Southern California Gas Company.
E. H. Roseberry, Sprague Meter Company.
R. M. Stewart, Pacific Gas and Electric Company.
K. C. Tomlinson, Pacific Meter Works.
F. H. Winslow, Southern Counties Gas Company.
W. E. Bradford, Northwest Cities Gas Company.
Chester Smith, Northwest Cities Gas Company.
J. J. Egginton, British Columbia Electric Power & Gas Co., Ltd.
J. H. Hill, Pittsburgh Equitable Meter Company.

W. M. Henderson

GOVERNORS AND REGULATORS

F. H. Winslow, Chairman, Southern Counties Gas Company.
Fred Hough, Southern Counties Gas Co.
Wm. Furlong, Southern California Gas Co.
Walter Pieper, Southern California Gas Co.
Otto Goldkamp, San Diego Consolidated Gas & Elec. Co.
E. G. Campbell, Pacific Gas & Elec. Co.
D. S. Kelleway, 234 Flanders St., Portland, Ore.
H. S. Harris, Los Angeles Gas & Elec. Corporation.

PIPE PROTECTION

F. S. Honberger, Chairman, Southern California Gas Company.
E. P. Bly, Standard Oil Company.
Guy Corfield, Los Angeles Gas & Electric Corporation.
M. E. Waite, San Diego Consolidated Gas & Electric Company.
Dr. Scott Ewing, Bureau of Standards, Dept. of Commerce, Washington.
Malcolm Burton, Southern California Gas Co.

UNACCOUNTED-FOR GAS

C. A. Renz, Chairman, Los Angeles Gas and Electric Corporation.
C. J. Melrose, Spokane Gas and Fuel Company.
L. L. La Rose, Northwest Cities Gas Company.
D. H. Perkins, San Diego Consolidated Gas & Elec. Co.
L. L. Biggs, Southern California Gas Co.
D. B. Larson, Portland Gas & Coke Co.
E. G. Campbell, Pacific Gas & Elec. Co.
Geo. McKay, Pacific Gas & Elec. Co.
Geo. Porter, Southern California Gas Co.
Walter L. McKee, Southern Counties Gas Co.

DISTRIBUTION DESIGN

N. L. Hoff, Chairman; Los Angeles Gas & Electric Corporation.
D. H. Perkins, San Diego Consolidated Gas & Electric Co.
A. B. Meyer, Southern California Gas Co.
F. S. Honberger, Southern California Gas Co.
Eugene Boose, Southern California Gas Co.
R. V. Wilson, Pacific Gas & Elec. Co.
D. B. Larson, Portland Gas & Coke Co.
Fred Koken, Northwest Cities Gas Co., Pendleton, Ore.
J. H. Wharmby, British Columbia Power & Gas Co., Vancouver.

Why Gas Is Better

By O. J. KAUFFMAN

*Los Angeles Gas and Electric Corporation**

THIS subject invites the inference that gas is better than any other source of heat energy for domestic and industrial purposes. Broadly speaking, there are only two sources of artificial heat energy that are commercially valuable; first, fuel, such as wood, coke, coal, oil and gas; secondly, electricity.

O. J. Kauffman

The selection of the proper source of heat energy is one of the most difficult problems with which industrial and production engineers have to deal. So important is it that success or failure may depend upon the selection made.

From the many, many factors to be considered in choosing the source of heat energy best adapted to the requirements of a specific domestic or industrial purpose, only a few of the outstanding factors may be discussed within the limits of this theme. My major premise is based upon a determination of the standard of quality that is to characterize the product. Assuming that determination to be a loaf of bread, a steel forging, a ceramic or any other product requiring heat processing, of superior quality with but few if any equals, it necessarily follows that no source of heat energy is adequate if it cannot be so utilized as to produce a perfect product in that particular field of industrial effort. My minor premise is that of producing a perfect quality of product at a minimum overall or unit cost.

Not only must the source of heat energy chosen be adequate to meet the requirements to be imposed upon it, but it must also be available, accessible, applicable, flexible, responsive, uniform, controllable, and economical. This wide range of characteristics introduces the regional factor, for the sources of heat energy are not of general or wide-spread distribution, each being confined to more or less limited areas. Because of this fact, wood, coke, and coal may be eliminated from consideration, so far as the Pacific Southwest is concerned, and the choice limited to oil, electricity or gas.

Oil, electricity, and gas are equally adequate, available and accessible in this locality, but neither oil nor electricity approaches gas in its directness of application, its flexibility, its responsiveness, its uniformity, its controllability or its economy.

Gas as a fuel requires no investment in a stock or supply. It is delivered, to all intents and purposes, to the point of consumption ready for utilization upon opening a valve, and it is paid for subsequent to its use. Gas requires no investment in storage space and equipment; no investment in local transportation equipment; no investment in auxiliary and accessory preparation equipment; no investment in equipment for the removal of waste products of combustion and no exorbitant investment in ovens or furnaces. Hence, its directness of application.

The curve expressing the ratio of the cost of gas to its effective value, through a range of temperatures from the lowest to the highest used for domestic or industrial purposes, conforms more nearly to a straight line than that for any other source of heat energy. Hence, its flexibility.

The use of gas eliminates wasteful delays in securing the desired working temperatures. A predetermined oven or furnace temperature is attained almost instantly after a valve is opened and the gas ignited.

*Second prize essay in 1929 contest conducted by Public Relations Section of Pacific Coast Gas Association.

Changes from one working temperature to another, either higher or lower, are accomplished with the same incredible speed as that in which the original temperature was attained. This results in elimination of "stand by" losses for intermittent operations, and proves to be most satisfactory in continuous charging processes. Hence, its responsiveness.

The B.t.u. content of gas varies so slightly from day to day as to be practically constant. Hence, its uniformity.

Because of its uniformity in physical and chemical composition and because of its responsiveness to fixed or changing working conditions, it lends itself most readily to perfect, automatic control, not only of temperatures, but of the desired furnace atmospheric conditions—oxidizing, reducing or neutral—as well.

Not only because the use of gas requires a minimum capital investment, and not only because the above characteristics, through its utilization, make a perfect product possible; but also because the use of gas minimizes maintenance charges, interest on investment, depreciation, taxes, insurance, and operating labor; and also, because it has a high ratio of effective value as compared with its cost, its economy is established, its supremacy as a source of heat energy is maintained, and its distinction of being "The Aristocrat of Fuels" is justly merited.

With gas classified as the acme of perfection in fuels, I will consider the merits of electricity as a source of heat energy, having made, so far, only the most casual reference to it. A sense of fairness compels me to admit that electricity possesses many of the admirable characteristics of gas. It fails to qualify, however, in flexibility, responsiveness, simplicity of control, and economy. It requires greater capital investment and consequently greater maintenance and overhead charges than gas.

It is conceded by the highest engineering authorities that electricity is most economically and efficiently generated by steam plants using gas as fuel. With this admission, it is only logical to conclude that it is economically unwise and unsound to generate electricity by using gas as fuel and to incur the cost of transmitting and distributing it, with the ultimate purpose of converting it into heat energy again, to produce a commodity of no higher quality than can be produced through the proper utilization of gas applied directly to the process.

From the foregoing, incontrovertible and demonstrable facts, I conclude that a perfect loaf of bread, a perfect steel forging, a perfect ceramic or a perfect product in any other field of industry, requiring heat processing, can be produced with gas; and that the overall or unit cost of producing it is lower than that which obtains when any other source of heat energy is used. That is "Why Gas Is Better."

H. C. MORRIS DIRECTOR OF GREAT NATIONAL LIFE INSURANCE CO.

Henry C. Morris, president of the Dallas Gas Company, vice-president of the Fort Worth Gas Company and chairman of the Natural Gas Department of the American Gas Association, has been elected a director of the Great National Life Insurance Company which has home offices in Dallas, Texas.

ST. JOSEPH GAS CO. BUILDS LINE TO PACKING PLANT

The St. Joseph, Missouri, Gas Company, a Doherty holding, is laying a 10-inch main from South St. Joseph, to serve the Swift & Company packing plant of St. Joseph with gas.

H. F. Weeks

A. B. Tunis

Tunis Succeeds Weeks *on* A. G. A. Staff

HOWARD F. Weeks, for the past four years editor of the A. G. A. Monthly, and for several months secretary of the Publicity and Advertising Section, resigned December 1, to join the Consolidated Gas Company of New York as assistant manager of the advertising and display department. He will be succeeded by A. B. Tunis, secretary of the Virginia Public Utilities Association, Richmond, Va., and director of the Virginia Committee on Utility Information.

Mr. Weeks joined the A. G. A. Staff in January 1926, as editor of the Monthly and assistant secretary of the Publicity and Advertising Section. In August 1929 he was made secretary of the publicity section. Mr. Weeks is also treasurer of the Public Utilities Advertising Association. He attended Brown University, Providence, R. I.

Mr. Tunis has had varied experience in editorial and publicity work. A native of Maryland, he was educated at the Norfolk, Va., Academy, and his first work was as a reporter on the Ledger-Dispatch at Norfolk. Later he became city editor of the Times-Dispatch, at Richmond; for two years was on the copy-writing staff of an advertising agency, and for five years was agent of the public relations department of the Chesapeake and Ohio railway, editing its employee magazine. Mr. Tunis has been connected with the Virginia Utilities Association since January 1928.

Gas Has Large Place *on* P. G. *and* E. Budget

THE Pacific Gas and Electric Company will spend $35,000,000 during 1930 on construction of new gas and electric projects, and normal extensions and improvements throughout the system will bring the year's building budget up to the record sum of $40,000,000.

Twelve million dollars of the P. G. and E. budget will be used to complete the natural gas system. Construction crews will complete the company's second network of pipe lines from the Kettleman Hills, which will serve the communities of the San Joaquin and Sacramento Valleys and the Redwood Empire. This line will be completed early next Spring and will be linked up with the system that now serves Fresno, Salinas, Monterey, San Jose and San Mateo County, and industries in San Francisco and Oakland. The company then will have more than 750 miles of natural gas pipe lines, representing a total investment of $27,500,000 and serving 471,000 of its 485,000 consumers. San Francisco and the East Bay cities will be furnished with straight natural gas when the new pipeline is completed. The two pipelines will afford a double source of supply.

Apart from the natural gas project, the company will spend $3,000,000 on additions to its present gas system—on new holders, on 200 or more miles of new mains and on new equipment for its various plants.

The outstanding item on the budget for new buildings is the San Francisco service group, which will cost $1,000,000. The buildings will occupy the block bounded by Folsom, Shotwell, Eighteenth and Nineteenth Streets, and will include a 300-car garage, shops and warehouses. The list also includes new offices at San Rafael and reconstruction of the offices at Sacramento, Chico and Martinez, and new service groups at Santa Rosa and Placerville.

N. H. King Now *on* Staff *of* C. B. Babcock Co.

N. H. KING, formerly commercial agent for the Southern Counties Gas Company at San Pedro, California, has recently joined the staff of C. B. Babcock Company, of San Francisco, California, manufacturers representative. Mr. King will travel in Northern California territory and the Pacific Northwest.

N. H. King

C. B. Babcock Company represents the General Gas Light Company, Geo. D. Roper Corporation, Johnson Gas Appliance Company, Safety Gas Main Stopper Company, and the Walmar Laboratory Products Company.

Central Butane System *at* Moorepark, Calif.

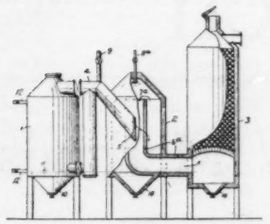
THE Southern Counties Gas Company is installing a central storage and distribution system for the service of butane gas in Moorepark, 24 miles southeast of Ventura, California. While tanked gas has been in service in many sparsely settled districts for some time, Moorepark is one of the first communities in the West to make use of central distribution. Service is expected to be available by February 1.

Butane will be extracted from natural gas at the Saticoy high pressure absorption plant of the Norwalk Gasoline Company, located a few miles from Moorepark on the Ventura Fuel Company's gas line to the Los Angeles area. The butane, in liquid form, will be transported to Moorepark by tank truck and deposited in a high pressure tank to be erected there. It will remain a liquid as stored, vaporizing when pressure is released at a regulator installation near the storage tank. The butane will be mixed with the necessary air at the consumer's appliance.

No attendant will be required for the equipment, as it will be a complete automatically controlled unit. A standard low pressure distribution system will be used. Each consumer's meter will register the number of pounds used, as all charges are to be made on that basis.

THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,726,317. CARBURETED WATER-GAS APPARATUS. ROBERT M. SEARLE, Rochester, N. Y. Filed July 23, 1924, Serial No. 727,627. 2 Claims. (Cl. 48—80.)



2. A carbureted water gas apparatus having in combination; a water gas generator, an internally unobstructed cylindrical carbureter and dust catcher, a superheater, a gas conduit leading from the generator and having a downward and tangential outlet portion discharging through the cylindrical wall of the carbureter, and an axial gas conduit leading from the interior of the carbureter to the superheater. ..

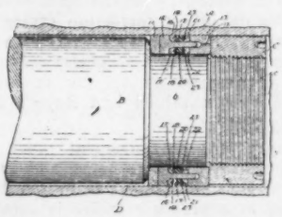
1,726,018. COMPRESSED GAS. MERCER G. FARRAR, Scarsdale, N. Y., assignor to Carbide & Carbon Chemicals Corp., a Corporation of New York. Filed May 1, 1928. Serial No. 274,358. 19 Claims. (Cl. 44—9.)

1. The method of preventing the formation of congealed condensate in the exit pipe of a holder containing compressed gas which comprises introducing into the holder a minor proportion of a volatile substance freely soluble in water.

1,725,908. LOCK FOR METER COVERS. AUGUST W. GERNETH and STAN HASBALL, Gainesville, Tex. Filed July 24, 1928. Serial No. 295,048. 2 Claims. (Cl. 17—14.)

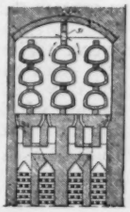
1. In mechanism for the purpose set forth, the combination of a case, a cover seating therein and provided on its under side with diametrically opposite guides, and a resilient A-shaped locking rod disposed entirely in a single plane close to and approximately parallel with the underside of the cover and having its ends constituting bolts passing through the respective guides to engage the case, one leg of the rod having an open key-engageable loop formed therein.

1,725,836. PACKING FOR HIGH-PRESSURE JOINTS. JOHN C. SOLBERG, Arlington, Mass., assignor of one-half to Frederick C. Langenberg, Cambridge, Mass. Filed June 12, 1925. Serial No. 36,754. 2 Claims. (Cl. 74—109.)



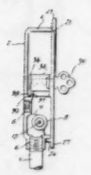
1. The improved packing which includes as a part thereof a pair of rings having grooves on their opposing faces, said grooves being filled with a relatively soft metal and a ring of compressible material such as rubber between the two metallic rings.

1,725,149. GAS RETORT. HEINRICH KOPPERS, Essen-Ruhr, Germany, assignor to The Koppers Development Corporation, Pittsburgh, Pa., a Corporation of Pennsylvania. Filed July 8, 1921. Serial No. 483,143, and in Germany Feb. 2, 1920. 5 Claims. (Cl. 202—113.)



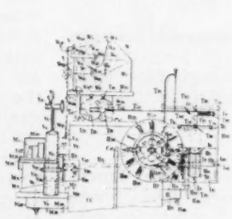
1. In a gas retort structure, in combination, a plurality of retorts grouped in a flame chamber common to and enveloping said grouped retorts, said chamber being partitioned into two groups of flame flues, for alternate inflow and outflow, that surround said retorts and port into a crown-space in the top of said chamber above and extending over the group of said flues and retorts, a partition dividing said crown space between the two portions thereof into which respectively the said inflow and outflow flues port, the said partition having in it a port that determines the place of the flow from the said inflow portion to the said outflow portion of said crown-space; and regenerators respectively connected with said alternately inflow and outflow flues; substantially as specified

1,716,536. GAS-SHUT-OFF PULL BOX. HENRY SIEBEN, New York, N. Y. Filed Mar. 7, 1927. Serial No. 173,589. 12 Claims. (Cl. 137—111.)



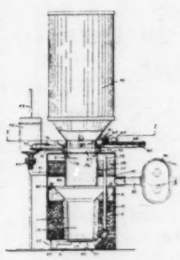
2. A gas shut-off pull box provided with an open front and having an opening through which a cable may be led into the interior of the box, said box having an undercut overhang at the upper portion of its open front, and at least one retaining lug at its bottom, in combination with a cover adapted to close the open front of the box and shaped at its top to interfit with the undercut overhang and to interfit at its bottom with the retaining lug of the box, means for securing the cover against edgewise movement with respect to the box.

1,726,140. RECORDING GAS CALORIMETER. CHARLES VERNON BOYS, Westminster, London, England. Filed Jan. 27, 1921. Serial No. 440,453. 12 Claims. (Cl. 73—184.)



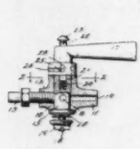
12. A gas calorimeter, including rate of water flow controlling mechanism, gas flow governing mechanism, integrating mechanism and common driving means for said three mechanisms, said means comprising a source of constant power.

1,724,525. GAS PRODUCER. HARRY F. SMITH, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio, a Corporation of Ohio. Filed Jan. 30, 1922. Serial No. 532,724. 3 Claims. (Cl. 48—86.)



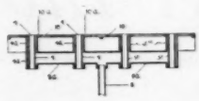
1. A gas producer of the character described adapted to be assembled in inverted position, comprising a producer shell having an open lower end, a ring supported within the shell intermediate its ends, a lining extending beneath the supporting ring and adapted to be inserted into the shell through said open lower end and to be supported by said ring when the shell is in inverted position, and a bottom closure plate for closing said lower end of the shell.

1,703,701. VALVE LOCK. ADOLF ZELNIO, SZYMON ZELNIO, and ZYGMUNT ZELNIO, Moline, Ill. Filed Feb. 13, 1928. Serial No. 254,187. 1 Claim. (Cl. 251—164.)



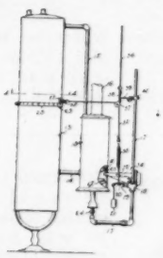
In a device of the type described a valve casing and a valve plug therewithin formed with a bore having polygonal cross-sectional shape, a polygonal lug positioned within the bore to be axially and centrally of the plug, a pin upon said lug, said valve plug having an oblong slot communicating with the bore through which said pin extends, said valve casing being provided with a bayonet slot including a vertical portion, said pin extending to and operating within said bayonet slot, and tensioning means in said bore for driving said lug upwardly to expose a portion of the same without the plug and for bringing about an automatic engagement of said pin with said vertical portion of said bayonet slot when the valve remains closed for the purpose of maintaining the valve plug against rotation.

1,723,667. GAS RANGE. WILLIAM F. TRAUB, Chicago, Ill. Filed June 19, 1922. Serial No. 569,285. 2 Claims. (Cl. 158—110.)



1. A burner having a pipe open at both ends through which air passes, a second pipe surrounding the first pipe and spaced therefrom, the space between the two pipes closed at one end and open at the other end, a perforated plate through which the open ends of both of said pipes project, the opening in the plate being larger than the outer pipe so as to leave an air space surrounding it through which air passes when the burner is operated, and means for admitting gas in the space between the two pipes, the ends of said pipes being substantially flush with the top of said perforated plate.

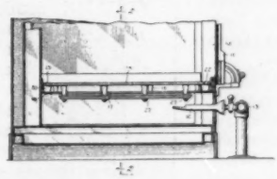
1,725,876. SAFETY DEVICE FOR GAS WATER HEATERS. JULIUS K. LUTHE and ROY W. JOHNSON, Milwaukee, Wis., assignors, by mesne assignments, to Time-O-Stat Controls Company, a Corporation of Maryland. Filed Nov. 9, 1925. Serial No. 67,846. 9 Claims. (Cl. 126—351.)



1. In water heating apparatus, a heater, a pilot light therefor, a valve controlling the flow of fuel to the heater, a storage tank, means controlled from a point removed from said heater for opening said valve, means for closing said valve upon release of said first-named means, said first-named means comprising a multipart cable, and means associated with one of said cable part for automatically releasing said valve independently of the other said cable part in the event the heat of said tank becomes excessive.

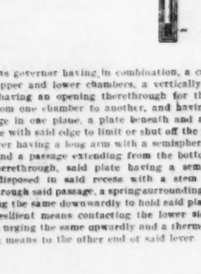
1,726,498. HEATER PLATE FOR RANGES, OVENS, AND THE LIKE. CHARLES B. MORSE, Brooklyn, and HENRY ALEXANDER CHEVOLA, New York, N. Y., assignors to L. Barth & Co. Inc., New York, N. Y., a Corporation of New York. Filed June 28, 1924. Serial No. 723,032. 2 Claims. (Cl. 126—275.)

1. The combination with an oven structure including supporting flanges on its walls near the bottom of the oven and a burner below the flanges, of an upper heating plate having legs supporting it upon said flanges and spaced



above them, and a lower plate of smaller peripheral dimensions than the upper plate, secured below the upper plate in spaced relation thereto and above the burner.

1,724,252. GAS GOVERNOR FOR TYPE-CASTING MACHINES. VITUS A. BOKER, Minneapolis, Minn., assignor to Roy E. Holland, Minneapolis, Minn. Filed May 25, 1923. Serial No. 32,723. Renewed Apr. 13, 1929. 4 Claims. (Cl. 236—102.)



1. A gas governor having in combination, a casing comprising upper and lower chambers, a vertically adjustable member having an opening therethrough for the passage of gas from one chamber to another, and having a lower sharp edge in one plane, a plate beneath and adapted to co-operate with said edge to limit or shut off the passage of gas, a lever having a long arm with a semispherical recess therein and a passage extending from the bottom of said recess therethrough, said plate having a semi-spherical portion disposed in said recess with a stem extending loosely through said passage, a spring surrounding said stem and urging the same downwardly to hold said plate in position, a resilient means contacting the lower side of said lever and urging the same upwardly and a thermostatically operating means to the other end of said lever.

1,723,180. GAS BURNER. HARRY E. KERR, Cleveland, Ohio, assignor to The Cleveland Gas Burner & Appliance Company, Cleveland, Ohio, a Corporation of Ohio. Filed Apr. 29, 1926. Serial No. 105,436. 2 Claims. (Cl. 158—113.)

1. A gas burner, comprising an air and gas commingling tube of small cross section having air orifices of restricted area therein, and adapted to jet under normal gas pressure a stream of gas and air a substantial distance beyond the mouth of the tube, a forked member sleeved upon said tube having notched edges and a small circular plate detachably clamped between the notched edges of said forked member, said plate being formed with a smooth centrally concave-shaped bottom encircled by a convex-shaped zone.

1,716,479. GAS ABSORBER FOR PRODUCTS OF COMBUSTION. JACOB BILSKY, now, by change of name, John Gregory Billings, Chicago, Ill. Filed Feb. 9, 1927. Serial No. 166,840. 8 Claims. (Cl. 252—2.)

6. A chemical gas absorber of the type described, comprising active carbon and carbon monoxide absorptive chemicals, and an oxidizing catalyst.

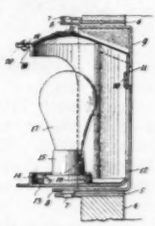
7. A gas absorber for products of combustion, comprising a plurality of separate layers, one of said layers containing cuprous chloride and palladium chloride for absorbing carbon monoxide gas.

8. A gas absorber for products of combustion, comprising a plurality of separate layers, one of said layers containing hexamethylenetetramine.

1,709,197. GAS BURNER. PHILIP J. SONNER, Winfield, Kans. Filed Apr. 25, 1927. Serial No. 186,516. 2 Claims. (Cl. 158—104.)

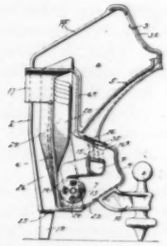
1. In gas burners, a gas manifold comprising a pair of horizontally disposed, parallel, side, tubular elements; a pair of bracket elements closing the ends of said paired tubes; and a transverse tubular unit having a gas inlet arranged intermediate the brackets and effecting communication between the tubular elements; a plurality of jets for each side tubular element arranged as a series of paired jets, each pair of jets being positioned one on either side of the longitudinal axis of its tubular element.

1,716,809. DEVICE FOR INSPECTING OVENS. PAUL SIEGERT, Yonkers, N. Y. Filed May 28, 1928. Serial No. 280,984. 2 Claims. (Cl. 240—5.)



1. In combination with a wall of an oven, said wall having an aperture, a device for illuminating the interior of the oven, said device comprising a frame pivotally supported by the wall, the rear wall of the frame having a portion cut and bent to form a hook, a casing having a rear wall cut so that it may engage the hook, a socket mounted on the base of the casing, and an incandescent lamp mounted in the socket.

1,725,162. GAS HEATER. JOSEPH SCHOENFELD, Alameda, Calif. Filed Sept. 22, 1926. Serial No. 136,948. 5 Claims. (Cl. 126—82.)



1. In a heater of the character described, a housing having an opening formed therein, a gas burner within the housing and below said opening, a plate of thin imperforated material covering said opening and adapted to be heated to a glowing temperature by the flame of the burner to radiate heat and light rays, said plate preventing the escape of products of combustion, and a discharge flue in communication with the housing to carry away the products of combustion.

With *the* Metermen

Compressibility *of* Natural Gas *and* Methods *for* Its Determination

By R. N. DONALDSON
*Standard Oil Company of California**

THE compressibility of gases at constant temperature was first investigated by the English physicist Robert Boyle in 1664 and later confirmed by the French chemist Mariotte in 1676. They found that the product of the pressure and the volume of a gas was a constant, or

$$p\,v = p_o\,v_o = \text{constant}$$

where p_o and v_o are the original pressure and volume of the gas. Boyle himself realized that there might be deviations from this law, but the experimental facilities at that time were such that it could not be shown that this was so. Later work showed that this law had deviations which varied with different gases and temperatures and pressures. In general, gases are more compressible than is indicated by Boyle's Law and this deviation increases with the size of the molecule, and is greater the closer the gas is to its condensation temperature. That is, in the case of any particular gas the deviation from Boyle's Law at any pressure increases as the temperature decreases. Hydrogen and helium are exceptions to these statements, as they are less compressible than a perfect gas.

The deviations from Boyle's Law usually published are in the form of compressibility correction factors

$$\frac{p\,v}{p_o v_o} = Y_1$$

where Y_1 is the compressibility correction factor. At ordinary temperatures and pressures these factors are usually less than unity. As an example, assume that 10 cu. ft. (v_o) of air at 1 atmosphere absolute pressure (p_o) is compressed to 10 atmospheres absolute (p); what will be the final volume (v)? If the deviation correction factor for 10 atmospheres is 0.9965 substitution in the above formula will give a final volume of 0.9965 cu. ft. instead of 1.0 cu. ft. which would have been obtained had Boyle's Law been strictly true.

In ordinary gas measurement work the gas is metered at a high pressure and in the meter calculation the high pressure volume is calculated to a pressure which is substantially atmospheric. This is an expansion and it becomes more convenient to have the correction factor in the form

$$\frac{p_o v_o}{p\,v} = Y$$

which is the reciprocal of the compressibility factor and will be greater than unity for all ordinary gases and pressures encountered in commercial work. With the factors in this form the meter calculations can be made in the ordinary way and the result multiplied by this factor, which might be called an "expansibility correction factor."

Figure 1 shows curves of such factors for air at different temperatures.

The value of the correction factors for commercial gas mixtures such as natural gas can be arrived at by calculation or by direct experiment. The calculation method will not be discussed here as, until very recently satisfactory fractional analyses of the gases have not been available and sufficient work

*Presented before the Southern California Meter Association, December 19, 1929.

Pre-Christmas Session *of* Metermen *at* Downey

FOR the first time in several months, the Southern California Meter Association held its monthly meeting December 19, at the Rio Hondo Country Club near Downey, California. The meeting developed into a combination business session and Christmas party, 80 members being present for the dinner.

Two papers made up the program, "Deviation from Boyle's Law as Applied to Gas Measurements," by R. N. Donaldson, Standard Oil Company of California; and "Design of Sampling Bombs and Methods of Collecting Gravity Samples," by E. Valby, Richfield Oil Company. Both papers were followed by extended discussion. Mr. Valby's paper represented a contribution from the Association's Standards Committee.

One associate member and several active members were voted into the Association, among the latter being two applicants living in Colorado—C. H. M. Burnham, of the Colorado-Wyoming Gas Company and Bruce T. MacCannan, Public Service Company of Colorado.

Entertainment during the dinner hour was provided by a trio of singers from the Southern California Gas Company, composed of L. H. Dell, William Stone, and John E. Michelmore. A bountiful supply of complimentary cigars was furnished by the Sprague Meter Company, Pittsburgh Equitable Meter Company, and J. A. Campbell Company.

Following the program of papers and discussions, Carl W. Brockman, head of the Association's Gadget Club, introduced several members who described gadgets which they have entered in the prize contest being conducted. Many of the devices which have been submitted during past months were attractively mounted in panels for the inspection of members.

It has been announced that prizes for the three best "gadgets" will be awarded at the January meeting, which will take the form of the Association's Annual Hi-Jinks.

Concluding the December 19 session was a surprise visit from "Andy Claus," in the person of Malcolm Miller, chairman of the Association's Entertainment Committee, assisted by "Ike" and "Mike" Claus, alias Carl Brockman and Ken Miller. The fourth member of the Claus family, "Santa," was unable to be present, "Andy" explaining that he was detained on Signal Hill changing orifice plates. The Claus brothers distributed an assortment of gifts to the members, this entertaining feature being made possible through the courtesy of the Robinson Orifice Fitting Company, Fluor Construction Company, Neilan-Schumacher Company and the Commercial Iron Works.

Course Planned in Gas Measurement

THE Southern California Meter Association is making plans to sponsor an extension course in the several branches of measurement engineering.

It is proposed to immediately start an extension correspondence course on gas measurement, and the Association desires to secure an expression of opinion as to how many would be interested in such a course. As now planned it would consist of some 20 lessons covering the mathematics and physics involved in gas measurement, as well as practical problems in metering.

A capable educator of Southern California will direct the course, assisted by an educational advisory committee of 15 Southern California Meter Association members.

The course will be open to everyone, no matter where he may be located. A nominal fee which can be met in several payments will be charged.

Any reader of *Western Gas* who may be interested in taking this extension correspondence course on gas measurement, or who may wish more information regarding it, is asked to address his inquiries to

R. F. Angell, President,
Southern California Meter Association
Box 758
Wilmington, California

has not been done to rely on the results of such calculations.

Two experimental methods will be discussed. They are the so-called "bottle method" and a method recently worked out by the U. S. Bureau of Standards.

The "bottle method" was developed several years ago and has been used with slight modifications since then by at least one of the companies buying gas in California*

The method consists of expanding gas from a cylinder or "bottle" of known volume through a wet test meter, taking simultaneous pressure and meter readings as the pressure falls.

Figure 2 is a diagramatic sketch of the apparatus used.

A is the sample bomb, the volume of which is accurately known. It is kept at the temperature of the experiment by the water bath W. G is a pressure gauge calibrated in pound intervals (or 2-pound intervals for the higher pressures). The known volume of the cylinder includes the fittings and bourdon spring of the gauge. V is a needle valve. M is a wet test meter graduated in 0.001 cu. ft., and T is a thermometer on the discharge of the meter.

TEST PROCEDURE

The experimental procedure is as follows: The bomb A, whose volume should be about 1.2 cu. ft., is filled with the gas at its source after thorough purging and is brought to the temperature of the test, which is determined by the temperature at which the gas is being metered in the field. The pressure is taken at G and recorded. The meter is then set to zero and the valve V cracked slightly, allowing the gas to flow through the meter at a rate of about 0.2 cu. ft. per minute.

The data taken consist of:

(a) Simultaneous pressure and volume readings for every cubic foot through the meter.

(b) The temperature of the gas passing the meter is taken every 0.2 cu. ft. and recorded on a separate sheet.

(c) Barometer readings are similarly taken for every cubic foot.

(d) The temperature of the water bath is observed frequently to insure a constant temperature.

The test is started with a large test gauge of the proper range. When the pressure has dropped to about 25 lbs. per sq. in. a 25 lb. gauge is substituted to give more accurate pressure readings in the lower pressure range. The gauges are checked by dead weight at the end of the test.

The sheet containing the data and computed values has nine columns:

Col. 1: Recorded pressure gauge readings.

Col. 2: Corresponding meter readings.

Col. 3: Average temperature of all gas passing the meter up to the corresponding meter reading.

Col. 4: Average barometer up to corresponding meter reading.

Col. 5: True Gauge pressures from dead weight calibration of gauge.

Col. 6: True absolute pressure. Column 5 plus barometer at time of reading.

Col. 7: Corrected meter readings. The meter readings are corrected to 29.92 inches of mercury and the temperature of the experiment using the average barometer and temperature figures from columns 3 and 4.

Col. 8: Corrected volume of gas in the cylinder at any set of readings. It is obtained by adding to the total corrected volume of gas at the end of the test the volume remaining in the cylinder and then deducting the corresponding corrected meter reading from Col. 7.

Col. 9 is deviation correction factor and is obtained by dividing the actual volume of gas remaining in the cylinder (Col. 8) by the theoretical volume of gas that the cylinder should hold according to Boyle's Law. This theoretical volume for any particular pressure condition is

$$\frac{\text{Absolute pressure in lbs./sq. in.}}{\text{Standard Barometer in lbs./sq. in.}} \times V$$

where V is the volume of the cylinder in cubic feet.

The values of the deviation correction factor are plotted against gauge pressures and the resulting curve gives the correction factors to be applied to volumes of gas measured within the pressure range of the experiment where a displacement meter is used. When an orifice or flow meter is used the square root of the factor should be used. Usually both curves are shown and so labeled.

Figure 3 shows the type of curve obtained and the effect of different temperatures. These tests were made on a dry well gas.

The time required for a test varies with the initial pressure and usually will be from 8 to 10 hours, including sampling and calculations. One man can make the test, but better results are obtained by two and some of the calculations can be made during the experiment.

Before taking up the good and bad points of this method the Bureau of Standards method will be discussed.

In this method the general procedure is the same as for the "bottle" method in that a sample of gas under pressure is expanded from a bomb and pressures taken. The principal difference is in the method of carrying this out and in the computation of results. The method was worked out by the Bureau of Standards in connection with its orifice meter work with the American Gas Association. The essential features and computations were suggested by Dr. E. Buckingham of the Bureau and the details and construction worked out by Mr. H. S. Bean. Mr. Bean has written a detailed paper on the construction of the apparatus and the computations. A brief description only will be given here as it is beyond the scope of this paper to go into the details of the construction and computations.

Figure 4 is a diagrammatic sketch of the apparatus.

A is the sample bomb of about 36 cu. in. capacity, fitted with needle valves, 1 and 7.

B is the glass measuring burette of approximately the same volume as the bomb and having on the top stem a three-way stop-cock (3) so that the burette may be purged to atmosphere and filled from A through the needle valve 2.

C is a mercury reservoir connected with the burette B. By putting air pressure on

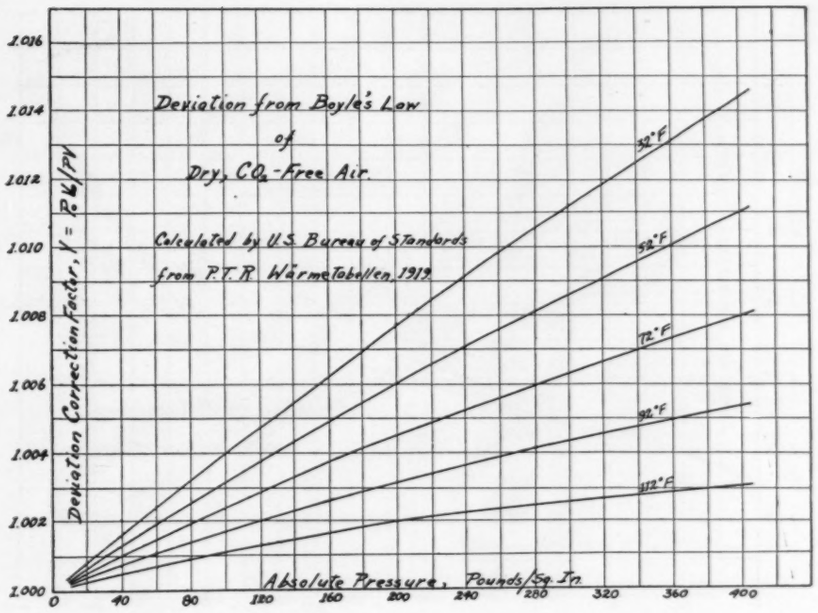


Fig. 1

*For a more complete description of this method see Proc. A.S.M.E. Vol. 47 No. 11 "Boyle's Law as Applied to the Measurement of High Pressure Gas," by D. E. Silcox.

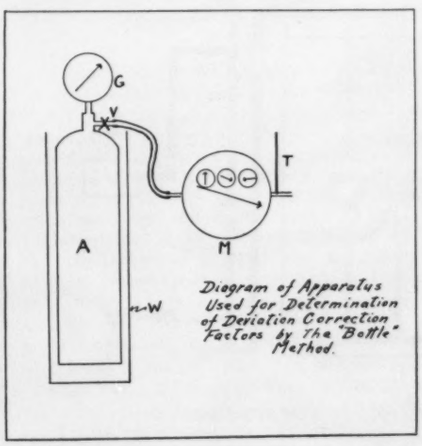


Fig. 2

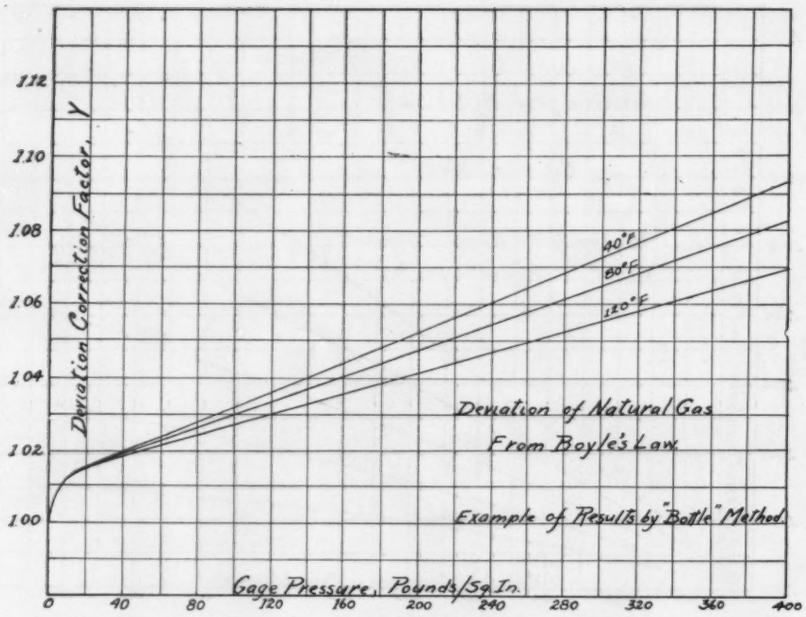


Fig. 3

the reservoir the burette can be filled with mercury.

E is an open manometer on the line between the burette and reservoir and is used to determine the pressure of gas in the burette by means of the inch scale F.

D is a mercury-oil seal through which the pressure from the bomb is transmitted to the dead weight gauge J. The upper part of the mercury side of the trap is glass tubing with an etched line, 14. The trap is connected to the bomb through capillary metal tubing.

The high pressure part of the appartus consists of the bomb, capillary tubing and trap to the etched line 14. The low pressure part is the burette from the etched line, 13, on the lower stem to the stop-cock. The ratio of the volume of the burette to the volume of the bomb and tubing must be known to about one part in 2,000.

The whole apparatus except the mercury-oil seal trap and dead weight gauge are contained in a water bath provided with windows for observing the burette, and air agitation for maintaining constant temperature.

The procedure for making a test is as follows:

The bomb is filled with the gas sample and connected to the capillary tubing. After coming to the proper temperature the valve 1 on the bomb is opened slightly and the pressure determined with the dead weight gauge. The weights are adjusted until the mercury level in the trap is at the etched line 14. All subsequent pressure readings are made with the mercury at the same level in the trap so the volume of the high pressure system is constant. Fractional weights in addition to those furnished with the dead weight are necessary and with a 5 or 10 to 1 ratio dead weight gauge the pressures can be measured to the nearest 0.05 lb. per sq. in.

After the first pressure reading has been taken the burette is vented to air and filled with mercury to the bore of the stop-cock by applying air pressure on the reservoir C. The stop-cock is then turned to connect the burette with the high pressure valve 2, and after venting the reservoir, gas is admitted to the burette from the bomb until the mercury level in the burette is near the etched line 13 on the lower stem. The pressure on the burette is then adjusted until the mercury level is exactly at the etched line 13 and the pressure is read on the manometer scale in inches of mercury. The scale zero of the manometer is level with the etched line on the burette. These operations constitute one cycle. The procedure is repeated until the bomb and burette pressure are equal and the last pressure reading will be approximately atmospheric and is read on the manometer.

The data taken for each cycle are:

1. Bomb pressure in pounds per square inch by dead weight.
2. Burette pressure in inches of mercury by manometer. In addition the barometric pressure is required and bath temperatures are taken frequently to insure a constant temperature.

Briefly, the computations are as follows:

When a burette full of gas is taken out the pressure in the bomb falls. If Boyle's Law held the pressure drop would depend on the ratio of burette to bomb volume and the pressure of the gas in the burette.

Let p_b = burette pressure in inches of mercury.

P_b = burette pressure in lbs. per sq. in. absolute.

P_b = (p_b plus Barometer) × F

where F is a factor changing inches of mercury to lbs. per sq. in.

If the bomb and burette volumes were exactly equal the value of P_b would be the theoretical pressure drop in the bomb. Ordinarily they will not be equal and the theoretical pressure drop per cycle will be

$$p_t = P_b \times \frac{V_b}{V_a}$$

where P_t is the theoretical pressure drop for the cycle and $\frac{V_b}{V_a}$ is the ratio of the volumes of the burette to bomb plus tubing. In this way the theoretical pressure drop for each cycle is calculated.

These values of the theoretical pressure drops are added, starting with the last obtained, and the subtotals set down, giving the theoretical gauge pressure for each cycle. To each of these is added the final absolute pressure in the burette, which is the same as in the bomb, giving a series of theoretical absolute pressures in the bomb P_t. The corresponding actual absolute pressures are obtained by adding the final absolute pressure in the bomb and burette to the actual gauge pressures obtained by the dead weight gauge. This gives a series of actual absolute pressures (P_a) corresponding to the theoretical absolute pressures, P_t.

The deviation correction factor then will be

$$\frac{P_t}{P_a} = Y$$

where Y is the deviation correction factor. These values thus obtained are of the same significance as those obtained by the "bottle" method and are plotted in the same way. The same method of calculation could be used in the Bureau of Standards method as

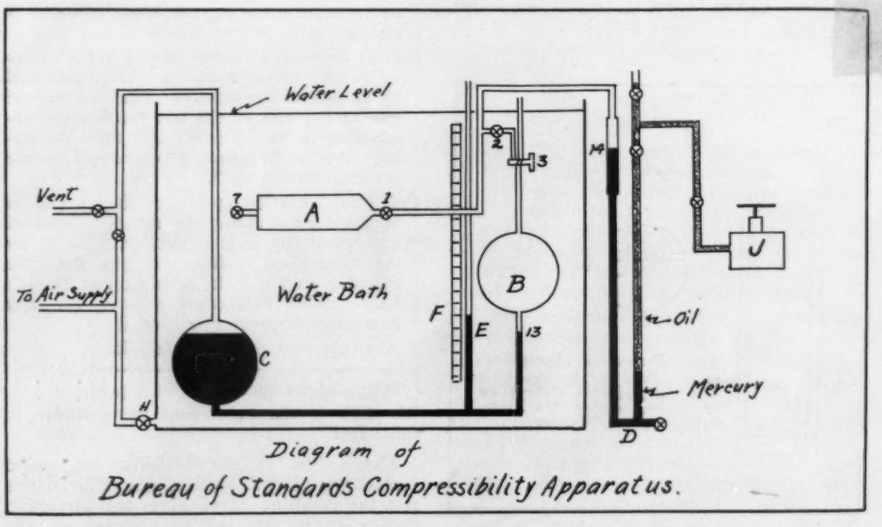


Fig. 4.

was used in the "bottle" method, using the actual volumes of gas obtained in the burette.

Figure 5 gives curves of results obtained by the Bureau of Standards method on a dry well gas at different temperatures.

COMPARISON OF THE TWO METHODS

The "bottle" method has the advantage of being simple and not requiring an expensive layout of apparatus. The use of the gauge in determining pressures has given considerable trouble, for after a gauge has been used a good deal in its upper range the calibration does not remain constant. This trouble can be eliminated by the use of a dead weight gauge operating through a mercury-oil seal such as was described in the Bureau of Standards apparatus. This has been tried out with very good results.

The use of the wet test meter in the "bottle" method introduces the effect of water vapor into the measurement. This apparently results in a hump in the low pressure part of the curve, as compared to the almost straight line obtained by the Bureau of Standards method. However, attempts to correct for water vapor do not eliminate the characteristic hump, although the curve as a whole was lowered.

The large bomb used in the "bottle" test has to be filled in the field, making it difficult to get check samples under the same operating conditions unless more than one calibrated container is provided. In taking the container out in the field there is always a chance of getting oil or water in the bomb during sampling.

The Bureau of Standards method has the following advantages:

The whole apparatus is at the same temperature (that of the experiment) thus eliminating temperature corrections.

The gas is handled over mercury, which does away with trouble from water vapor.

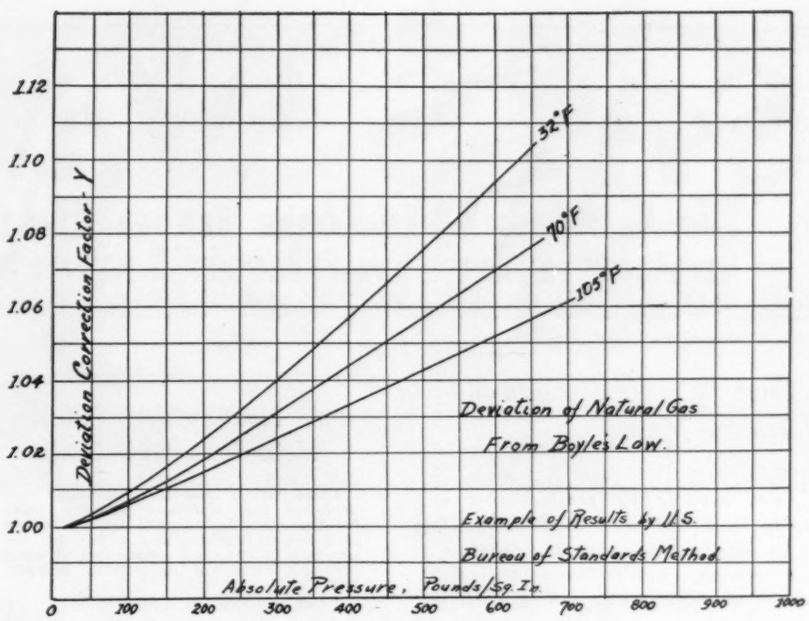


Fig. 5

The samples tested are small and the bomb can be filled in the laboratory from a large container without appreciably lowering its pressure, and check runs can be made from the same original sample. In this way the small bomb is not taken out in the field and can be kept dry and free from oil.

The time consumed in making a test, including calculation, is probably a little shorter for the Bureau of Standards method.

The main disadvantage with this method is that the apparatus is quite expensive and considerable care and time are necessary to build and calibrate it.

The results obtained by the Bureau of Standards apparatus are probably nearer the theoretical deviation than those obtained by the bottle method. This is shown by tests run on dry, CO_2 free air. Such tests check the curves shown in Figure 1 within 0.1 per cent and a sample of air can be run as a method for checking the value of the ratio of burette to bomb volumes, comparing the resulting curve with those given in Figure 1.

NEW GAS METER SHOP FOR SAN JOAQUIN L. & P.

Construction of a new meter shop for the Gas Department of the San Joaquin Light & Power Corporation at the Bakersfield steam plant of the company will be complete by the first of the year.

The structure, which will be one story and of concrete and will house the meter store room, will be 40 feet by 50 feet, according to a statement released by Wm. F. Tyler, district superintendent of distribution for the company at Bakersfield.

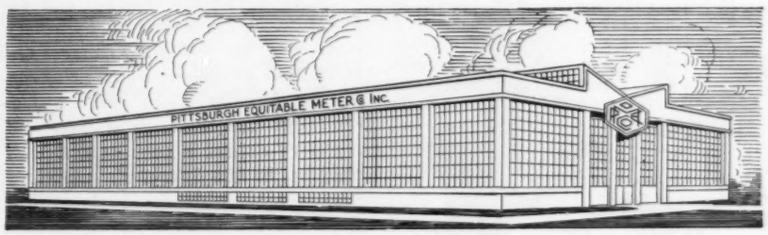
San Joaquin Light and Power has 9,000 gas meters on its Bakersfield system, with a peak day sendout of 10,000,000 cubic feet.

ARKANSAS NATURAL PLANS SIX MILLION DOLLAR EXPANSION

Arkansas Natural Gas Corporation has announced, through D. W. Harris, vice-president and general manager, an expansion program for 1930 amounting to approximately $6,000,000. The construction of new gas lines and compressor stations, the exploration and drilling of oil and gas wells, the acquisition of acreage and the building of new plants will be included in the expenditure.

OKLAHOMA UTILITIES ASS'N TO MEET AT TULSA IN MARCH

The Twelfth Annual Convention of the Oklahoma Utilities Association will be held at Tulsa, Oklahoma, on March 11, 12 and 13 at the Mayo Hotel. Edward F. McKay is manager for the Association.



Pittsburgh Equitable Meter Co. *to* Build Tulsa Branch

SHORTLY after the announcement of the proposed erection of a new building adjoining the present plant in Pittsburgh, the Pittsburgh Equitable Meter Company announces that a branch factory will be erected at Tulsa, Oklahoma, which will be devoted to the manufacture and servicing of Emco gas meters and regulators, and Pittsburgh gasoline, oil and water meters.

The new factory will be of brick and steel construction with the front of the building of white stucco. The company's Tulsa offices will be moved from the Kennedy Building to the new plant upon its completion. The grounds are to be landscaped and the property and building will be floodlighted at night.

Four years ago the company's first Tulsa office was opened with A. J. Kerr as district manager for the states of Oklahoma, Arkansas, New Mexico and northern Texas.

ARGUS GAS COMPANY NOW SERVING DODGE CITY

Argus Gas Company is now serving gas in Dodge City, Kansas, through a line completed from the Hugoton gas field. The company has franchises in a number of towns in this district, among them Meade, Plains, Colano, Missler, Fowler, Sublette, Elkhart, Copeland, Ensign, Rolla, Cimarron and Satanta. Arthur K. Lee is president of the company which has headquarters at Dodge City, Kansas. Gas is already being supplied by the company at Elkhart.

The Dodge City Daily Globe devoted its issue of Thursday, December 19, to the interests of natural gas, reviewing the natural gas development of 15 Kansas towns within the past year.

SALES WRINKLES

"He Gains Wisdom in a Happy Way Who Gains it by Another's Experience"... PLAUTUS

A Case Where Clothes Make the Man

SURVEYS PLAY A large part in the sales program, building up prospect lists and keeping them free from deadwood. They can do wonders in getting the salesman a good entrance. But sometimes the survey man has as much trouble getting a hearing as would a sales representative on a "cold turkey" approach. Read how the Pacific Gas and Electric Company handled that problem, as told by H. P. Dockstader:

WHILE waiting for natural gas to be delivered in San Francisco, we have had a number of men available to be used on a house-to-house survey of coal burning appliances. We want this information for our sales crews when the time comes to send them out on replacement prospects.

Twelve men are assigned to the work in this city, and while they were instructed to

give the housekeepers to understand that they are only making the survey, they experienced considerable difficulty in gaining admittance to the house. This probably was caused by the fact that housekeepers were afraid they would be obliged to listen to a sales talk for some appliance or other.

To overcome this, we have sent the survey men out each dressed in a suit of coveralls with "P G and E" lettered on the front and back. Since this dress has been adopted, the men have had no difficulty in securing entrance to the houses. Dressed in practical working garments, they appear to be what they claim, just service men, and not salesmen. While looking over the gas appliances to see that they are burning satisfactorily, they have the opportunity to gather all the needed information.

—*H. P. Dockstader.*

A Market for Sales Wrinkles—$10 Each

Three widely assorted "wrinkles" are published this month—a publicity stunt for the sales department; an aid to the sales survey worker; and a way for the salesman to stimulate cooperation of other company employees in getting prospect leads.

These wrinkles are submitted by:

Robert M. Spangler, Oklahoma Natural Gas Corporation, Okmulgee, Okla.

H. P. Dockstader, Pacific Gas and Electric Company, San Francisco.

F. E. Oettinger, Pacific Gas and Electric Company, San Francisco.

WESTERN GAS is making a standing offer of $10 for each sales wrinkle which is published in this monthly department.

Address your wrinkle to our publication office, 124 W. 4th Street, Los Angeles, California.

Unearthing a Mine of Sales Publicity

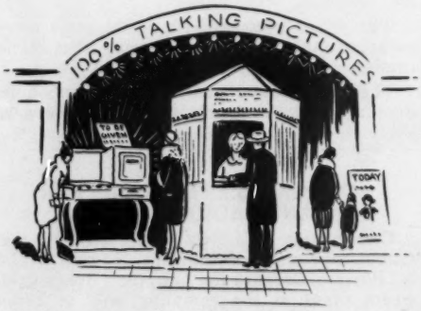
GETTING THE RIGHT KIND of publicity for sales work is a job that calls for ingenuity. From Robert M. Spangler, sales-manager of the Oklahoma Natural Gas Corporation at Okmulgee, we learn of a gas appliance drawing which put across the gas company's merchandising message and made scores of desirable sales contacts. Here is the plan, in Mr. Spangler's own words:

THE Oklahoma Natural Gas Corporation opened a new merchandise department in Okmulgee, Oklahoma, August 15, 1929, with a cooking school demonstration. We enjoyed a moderate sale of gas ranges in the opening month. However, we felt that in spite of our advertising a great number of people did not as yet know we were selling gas appliances. We were on the lookout for stunts which we might try, so as to get everyone in Okmulgee talking about our new merchandise department and visiting our display floor.

About the first of October, we received the first shipment of Magic Chef ranges. Here was a new vogue in gas ranges—something which should be displayed in proper surroundings; and thinking in this connection, I hit upon a plan. We called on the manager of the Orpheum Theatre and sold him the idea of giving us the lobby for displaying the new range; then we decided we would have a drawing for the range and give it to the lucky holder of the ticket. We had a double ticket printed. We also put a display card on the gas range telling the date the range was going to be given away.

The theatre gave away one ticket with each admission paid. We also gave tickets away at the gas office. The holder of each ticket had to come to the gas office and deposit one-half of the stub in a washing machine which was running, to thoroughly mix up the tickets.

For three weeks people came into our office who would have come in for no other purpose. Some came in as many as six or seven times. We advertised the fact that the range was on display for public showing at the Orpheum Theatre and also that "The Street Girl" was the current attraction at the theatre. We carried in large type in the ad the display line: "Get your free tickets at the Orpheum Theatre for Magic Chef which will be given away Monday night, October 21, 1929, at the Orpheum Theatre, 8:30 p.m."



The night of the drawing we had a wash tub with the tickets in it on the stage and had four business men as judges, and called a little girl from the audience to draw out the winning number.

The theatre was packed to capacity, the lobby also overflowed, and the street and sidewalk were blocked in front of the theatre. We relayed the number drawn by megaphone to the balcony and lobby, also to the street.

The theatre manager told us that it was the first time in six years that he had sold standing room. This theatre is chain-owned, and the management requested this plan in detail so that they might sell the idea to local gas companies in towns in which they operate.

It was a good publicity stunt for us, because we gained word-of-mouth advertising. Everyone in Okmulgee and in surrounding towns heard the news that the gas company had opened the merchandise department for the sale of approved gas appliances.

We have only 4,200 domestic meters and from August 15 to December 26 have sold 368 separate contracts for merchandise totaling over $30,000.

We believe this plan will go over in a big way anywhere in the United States. The theatre people can be assured of a full house

even with a mediocre attraction; gas companies are able to impress thousands of people that they are in the gas appliance business.

—Robert M. Spangler.

To..... .....
Name Date

.....
Division

This will acknowledge the receipt of your prospect slip stating that:

.....
Name of Prospect

.....
Address

is interested in

.....
Appliance

Prospect will be seen immediately. I wish to thank you personally for your cooperation.

.....
Name of Salesman

Courtesy Keeps Employee Prospect Leads Coming

IN any large company the sales department is assisted materially in its work if it can secure prospects from other departments. To stimulate and maintain interest in this activity, it is a good idea for salesmen to recognize this aid by sending a card to the donor immediately upon receipt of the prospect slip. This card acknowledges the slip with thanks and states that the prospect will be given immediate service. This direct and immediate response to the donor exhibits good will and recognition which cannot fail to stimulate him to further effort. A card form for this purpose is illustrated above.

—F. E. Oettinger.

K. B. ANDERSON IS INDUSTRIAL ENGINEER FOR COAST COUNTIES

J. B. WILSON, president of the Coast Counties Gas and Electric Company, has announced the appointment of Kenneth B. Anderson as industrial gas engineer for that company. Mr. Anderson is a graduate of the California Institute of Technology and comes to Coast Counties from the Southern California Gas Company, where he has been combustion engineer and supervisor of the bureau of unaccounted-for gas during the past four and one-half years.

K. B. Anderson

The advent of natural gas in the territory of the Coast Counties Gas and Electric Company is expected to materially increase the use of gas for industrial purposes, particularly in the important industrial area of Contra Costa County. There is also considerable development along industrial lines in the company's southern division, comprising Santa Cruz, Watsonville, Hollister, Gilroy and surrounding communities.

Texas-Louisiana Power Company's display floor at Graham, Texas

One Sales Executive's Definition of Merchandising...and Merchandisers

By L. D. WITTKOWER

Gas Merchandise Manager, Texas-Louisiana Power Company, Fort Worth, Texas

TEXAS-LOUISIANA Power Company has its headquarters in Fort Worth, Texas, operating gas properties in the following Texas communities: Ranger, Breckenridge, Woodson, Eliasville, Graham, Nocona, Gainesville, and Kermit. In all of these communities the company merchandises appliances.

Since coming to his present post of gas merchandise manager with this utility in February of last year, Mr. Whittkower has seen its gas appliance sales increase some 600 per cent. It goes without saying that he has had a large part in producing this showing, and his definition of what goes to make up the successful "gas merchandiser" will be read with interest.—EDITOR.

MERCHANDISING is one of the most interesting, fascinating and profitable lines of endeavor in the business world today, as it has been in the past. But there are no mysteries, no hocus-pocus to merchandising, as is the general accepted idea. Sound business principles, backed by honest business methods are the foundation and heart of any successful merchandising plan.

The ultimate goal of any merchandising plan is to sell. That sounds trite, but it is often lost sight of in a maze of pretty plans, charts, etc. To sell we must fill a need, whether we created that need or not. In the utility business the need we have to fill and the thing we have to sell both have the same name—Service. Not just empty platitudes, but actual, honest wholehearted service from beginning to end. And our job of selling service has just begun when the service connections are made. The only way the fuel available can be used is through appliances which the merchandising man is instrumental in bringing to the customers.

The merchandise man, to properly handle his task of service, must first of all be a salesman, but he cannot stop there. He must have a knowledge of purchasing, finance, traffic, and that sixth sense—"merchandising instinct." According to my interpretation, a man has merchandising instinct when he possesses the ability to correlate all the diverse factors affecting the sale of appliances in the territory he serves and get a clear picture of the items that will move at a profit both to the organization selling them and to the purchaser. To do that, the merchandise man must have an intimate knowledge of the character of his customers, their financial condition, their standard of living, the type of appliances they are using, their receptiveness to new ideas pertaining to the health and comfort of their families, and their feeling toward his concern. He must have a clear conception of what the future holds for his territory, and be able to make his plans accordingly.

After the appliances have been selected, the first step toward their sale in any well ordered merchandise campaign is to advertise them properly. Advertising, as well as being the most effective factor in the final sale of the appliances, reflects the character and policies of the company as nothing else can. It must be well planned and skillfully carried out. The far sighted merchandise man will do well to enlist the aid of a specialist to prepare the advertising that is to help him reach his goal.

Another tremendously important factor in closing the sale is the appearance of the offices and display rooms. Customers have been invited to call as our guests . . . are they going to be received in clean, restful, inviting surroundings? Nothing should be left undone that will make them feel we are genuinely glad to see them and that we are there to serve them. Regardless of the ap-

pearance of the customer, we can afford to play no favorites.

Back of the particular campaign being made is the whole fabric of public relations. A fair and square attitude, marked with courtesy and a willingness to "go the other mile", has a wholesome effect on results of the merchandise man's plans. When people talking about the company say "those people do what they say they will do. You can depend on their statements", the job is much easier. Particularly is this true of the public utilities who still have the problem of convincing the local merchants that their merchandising activities are an actual help to the merchant, for the main desire of the utility is to get appliances on the line, regardless of who sells them. All the educational work the utility does has a direct bearing on the local dealers' sales.

All the effort and thought of the man responsible for merchandising will be nullified, however, if the wholehearted cooperation of the organization is not behind him. The merchandising man's work is the sowing of the seed to make a crop of black figures, but the red figures of defeat are likely to show up unless his plans are intelligently carried out by the field force working under his direction.

An honest, sincere desire to be fair in all our dealings and to render a complete utility service cannot help but result in a well done job.

Larger Sales Budget *by* P. G. *and* E.

FACING in 1930 a possibility of reduction in the gross revenue from present consumers through the advent of natural gas and the consequent reduction in billings, the Pacific Gas and Electric Company, in laying plans for next year's activities, has increased its sales budget $200,000 over that of 1929, for a total of $1,138,000. Of this sum, $524,000 will be spent in the gas campaign, and the revenue quota of increased gas load has been set for $3,295,000. A staff of 196 men will be employed on this project.

This was the high point of the 1930 gas extension plan as outlined by H. M. Crawford, general sales manager of the P. G. and E., at the annual sales conference dinner held in the Fairmont Hotel, San Francisco, on December 20. Six hundred sales representatives, division and district managers of the Pacific Gas and Electric Company, from the principal cities and towns of northern and central California, were in attendance. The dinner and evening meeting marked the close of the all day session in which sales prospect plans were thoroughly discussed.

Speakers at the morning session included H. M. Crawford, R. T. Stephens, W. P. Bear and J. C. Jordan. The afternoon sessions were addressed by F. U. Naylor, F. S. Curren, A. L. Adkins, L. F. Galbraith, H. M. Crawford and E. F. Perkins.

Upon the concusion of the annual sales dinner the program was turned over temporarily to Frank Bevan and his P. G. and E. salesman entertainers.

At the conclusion of the salesmens' program, the A. F. Hockenbeamer trophy was presented to the Shasta Division for the highest percentage of quota attained on both gas and electric sales during 1929. President Hockenbeamer presented the beautiful oil painting to G. R. Milford, manager of the Shasta Division, and Harry Lee, his division sales manager.

The sales plan is to be supported by a general advertising program designed by the publicity department of which J. C. Jordan is manager. This will include the use of 250,000 column inches of newspaper space in 54 daily and 210 weekly newspapers, supplemented by hundreds of thousands of pieces of direct-by-mail sales material,—an increased advertising program aggregating nearly $200,000.

During the coming year particular stress is to be laid on increasing the house heating load; 147 men will be employed in this single phase of the activity.

The 1930 sales program of the P. G. and E. may be summarized tabularly as follows:

	Men	Cost	Revenue Quota
Gas Heating and Domestic Appliances	147	$270,000	$ 787,000
Industrial Gas	31	172,000	1,850,000
Hotel and Restaurant, and Miscellaneous Activities	18	82,000	658,000
Total	196	$524,000	$3,295,000

Whoopee Methods Sell Ranges *in the* South

(*Continued from Page 41*)

all ranges sold in the campaign was $75.56.

The results of this campaign—the enthusiasm generated in salespeople and prospects alike—and the widespread good will publicity in the various localities, proved that this type of campaign will do wonders if properly engineered. To put it over as was done in the South requires expert and constant generalship on the part of the executives. The officials of the Southern Cities Public Service were always on the job and they *sold* gas ranges.

OKLAHOMA UTILITIES CO. OPENS BRISTOW HEADQUARTERS

The Oklahoma Utilities Company, with B. P. Stockwell as general manager, formally opened its new headquarters at Bristow, Oklahoma, on November 21. The new quarters house, in addition to general offices of the company, the offices of the Southwest Pipe Line Company and the Southwest Production Company, affiliated interests.

Ample space is maintained at the new quarters for the display of gas appliances and for cooking demonstrations and similar activities. The company has placed a permanent glass meter in the show room, in order that the customers may become familiar with the mechanism of the gas meter.

J. F. Pollard *to* Manage Seattle Lighting

JAMES F. Pollard, since 1927 division manager of the Pacific Gas and Electric Company's Coast Valleys Division, is leaving California after 10 years of service with utilities of the state to become general manager of the Seattle Lighting Company.

James F. Pollard

Before the world war, Mr. Pollard was assistant engineer of the Railroad Commission of the State of California, later becoming manager of the Salinas District of the Coast Valleys Gas and Electric Company when it was owned by the Mason B. Starring interests of New York. Later he served as manager of the company, and was vice-president and manager under the ownership of the Byllesby Engineering and Management Corporation. Pacific Gas and Electric Company, with headquarters in San Francisco, bought the Coast Valleys Gas and Electric Company in 1927.

The Seattle Lighting Company, as announced in the December issue of *Western Gas*, was recently purchased by the Central Public Service Corporation of Chicago of which Albert E. Pierce is president. J. Earl Jones, formerly of the Portland Gas & Coke Company, goes with Mr. Pollard in the capacity of sales manager, as announced elsewhere in this issue. F. K. Lane, formerly treasurer and general manager of the Seattle utility, is resigning to look after private business interests.

A farewell dinner was tendered Mr. Pollard on December 27 at San Francisco, by the Electrical Development League. R. E. Fisher was chairman of the arrangements and C. T. Hutchinson presided over the meeting. David Harris, P. M. Downing, R. Alvord and Clyde Chamblin, all spoke briefly, wishing Mr. Pollard the best of success in his new endeavor. Eugene McCann, on behalf of the industry, presented Mr. Pollard with a fountain pen desk set as a farewell token of the high esteem in which he is held.

INCREASE SIZE OF P. G. AND E. LINE TO 26-INCH

The main gas transmission line of the P. G. and E., running up the East side of the San Joaquin Valley from Kettleman Hills, is being increased in size from 22-inch to 26-inch from Chang Station north. The smaller pipe which had been ordered for this division of the line will be utilized in distributing the gas to the various cities and towns outside of the Metropolitan Bay Area.

INDIANA-KENTUCKY GAS CORP. IS NEW SUBSIDIARY

Frank P. Parrish, president of the Missouri-Kansas Pipe Line Company, has announced the formation of the Indiana-Kentucky Gas Corporation, as a subsidiary company. One thousand shares of no par value common stock were issued, this being retained by the parent organization.

Reviewing *a* Memorable Year *in the* Western Gas Industry

(*Continued from Page 27*)

larger gas producing and distributing companies, assembled for that purpose at A. G. A. Headquarters in New York, and have been approved as a reasonable forecast.

"The customer contacts and day-to-day experiences of the companies represented in the conference reflect no disturbing change in business conditions or trends. They suggest no reason at this time for curtailing the contemplated expenditures for the construction of gas service facilities. On the contrary, it is conceivable that cheaper money, as predicted by many forecasters in economics, might accelerate construction especially on the natural gas side of the industry."

1929 Totals

So much for 1930. Dealing in national totals for 1929, the industry added almost a million customers, as set against half that number gained the year previous. Revenues rose to $950,000,000, a gain of about 9 per cent. An investment of $4,750,000,000 now lies at the service of the industry's 17,000,000 patrons.

The manufactured gas industry showed an 8 per cent gain in gas sales, achieving the record figure of 535 billion cubic feet sold.

More startling even are the figures for natural gas production—1,890 billion cubic feet last year—a 20.5 per cent increase over 1928. Gross operating revenues for natural gas companies shot to a new mark of $450,000,000, or 23.6 per cent above the $364,000,000 total for the preceding year period.

Classified gains for both manufactured and natural branches show a 4 per cent normal increase in uses other than househeating. Househeating betters the 1928 showing by more than 50 per cent—a remarkable tribute to the promotional work which has taken place in the last 12 months. Commercial and industrial utilization, including consumption in factories, hotels, restaurants, etc., registers a 12 per cent increase.

Dismissing grand totals for 1929 in these few paragraphs we now record briefly a few of the many individual company activities and organization projects which entered into the composite of gas progress for 1929 in the area west of the Mississippi.

For the purpose of this hurried review we turn through the news pages of *Western Gas* for the past 12 issues, and present the month-by-month story which they reveal.

January

Twenty-seven leaders of the industry in concise statements prepared for *Western Gas*, foretold a constructive year for 1929, with emphasis upon load-building activity—an estimate borne out in the year's experience as noted in the 1929 totals quoted earlier.

Janary 14-15: Natural gas men of the Southwest to the number of 350 met at Shreveport in the Natural Gas Department Southwest Division second annual conference.

A Western Metals Congress held its first session, January 14-18, at Los Angeles, featuring an exposition of metals and machinery. The Pacific Coast Gas Association conducted a gas session January 17, devoted to gas fuel for metal treatment.

Areas in Louisiana, Arkansas and Mississippi as well as Tennessee were opened to natural gas service through the Memphis Natural Gas Company's line from the Monroe field, Louisiana, to Memphis.

Pecos Valley Gas Company completed its line from the Artesia fields, New Mexico, to Roswell in that state.

New general offices for the Fort Worth Gas Company got under way.

Ground was broken on the Wyoming-Utah line of Western Public Service Corporation, destined to make natural gas available in Salt Lake, Ogden, and other Utah communities.

Washington, Oregon and Idaho gas properties of the Pacific Power & Light Company of Portland passed to the Northwest Cities Gas Company.

Two companies in the Oklahoma Panhandle, Texas Counties Gas Company and Cimarron Utilities Company, consolidated under the latter name.

Santa Maria Gas Company announced plans to extend natural gas lines as far north as Paso Robles, California.

Contracts were let on the El Paso Natural Gas Company's 205-mile line from New Mexico fields to El Paso.

Plans for an 800-mile pipe line from Monroe and Richland fields in Louisiana through Birmingham to Atlanta, Ga., and Chattanooga, Tennessee, were made known by the Southern Natural Gas Company of Birmingham, Alabama.

February

For the first time since 1925 the Pacific Coast was host to the American Gas Association Advisory Council and Executive Board, which met at Los Angeles February 6-7 with Pacific Coast leaders.

Western companies announced aggressive sales programs for 1929 in a symposium conducted by *Western Gas* at the request of the Pacific Coast Gas Association Sales Budgets Committee.

February 14-15: The Mid-West Regional Sales Conference was held at Chicago.

Operation began on first unit of the B. C. Electric Railway new water-gas plant at Vancouver.

The $13,000,000 natural gas project of the Pacific Gas and Electric Company, bringing natural gas from Buttonwillow and Kettleman Hills fields to the San Francisco Bay area, got under way.

Natural gas for Saint Louis industries was assured in the organization of the Mississippi River Fuel Corporation, to construct a 460-mile line from Richland and Monroe fields, Louisiana.

Southern Counties Gas Company, Los Angeles, completed arrangements for signing its gas holder properties in Southern California for aviation guides.

Laramie Gas Company, Laramie, Wyoming, was sold to Smith, Landeryou and Company, Omaha, Nebraska.

Pacific Gas and Electric Company let contracts for an 8,000,000 cubic foot holder at Oakland and a 10,000,000 cubic foot holder at San Francisco.

March

Pacific Lighting Corporation secured control of the Southern California Gas Corporation, placing Los Angeles Gas and Electric Corporation, Southern Counties Gas Company, and Southern California Gas Company, together with other Pacific Lighting properties, under common control.

March 12, 13, 14, were dates for the 11th annual convention of the Oklahoma Utilities Association, at which Thomas R. Weymouth, president of the Oklahoma Natural Gas Corporation, Tulsa, was elected president.

A 135-mile pipe line from Petrolia, Texas, to Fort Worth and Dallas was announced as planned by the Lone Star Gas Company.

The Pacific Gas and Electric Company launched intensive campaigns on ranges and water heaters in all territory outside the San Francisco Bay area.

Formation of the Cooper-Bessemer Corporation, a combination of the C. & G. Cooper Company and the Bessemer Gas Engine Company, was announced.

Pacific Gas and Electric Company completed its South San Francisco office building.

Line route surveys were started on the United Gas Company's gas carrier to Monterrey, Mexico, from Texas fields.

Plans for a $600,000 booster station near Pueblo, Colorado, on the Interstate Natural Gas Company's line to Denver were formed.

April

Texas Cities Gas Company began distribution of natural gas in Houston through a line extending across Galveston Bay to Houston Pipe Line Company trunk lines.

Mid-West Gas Association members held their 24th annual convention, electing E. H. Vieregg of Grand Island, Nebraska, president.

With an attendance of 450, the Sixth Meter Short Course held a three-day session at Norman, Oklahoma.

In its Eighth Annual Gas Range Week the Gas Appliance Society of California achieved new sales marks—950 ranges sold in San Francisco alone; average price of $133.50.

Cities Service Gas Company began a 73-miles line from Saginaw to a point southwest of Springfield, Missouri.

Two thousand men started work on the Mississippi River Fuel Corporation line to St. Louis, from the Monroe fields in Louisiana.

May

A definitely formulated program of co-operative advertising on the Pacific Coast, using radio and industrial trade magazines, was announced to begin August 14.

For the second time since coming under the A. G. A. banner, the Natural Gas Department met in annual convention, 1200 strong, at Kansas City.

Natural gas expansion plans in the San Joaquin Valley, involving about 150 miles of new pipe line, were announced by Southern California Gas Company.

Arkansas Natural Gas Corporation made known its program for piping gas from Monroe fields to Shreveport—a 100-mile transmission line project.

Laclede Gas Light Company of St. Louis laid plans for a 10,000,000 cubic feet holder.

A second main natural gas line to the San Francisco Bay area was announced for the Pacific Gas and Electric Company.

Southwest Gas Company began a 50-mile line extension from a point near Yoakum, Texas.

South Texas Pipe Line Company started construction on a 110-mile carrier from Refugio Fields to San Antonio and Austin, Texas.

Erection of a $500,000 compressor plant in the Kettleman Hills fields for the Pacific Gas and Electric Company was begun.

Southern Counties Gas Company made plans for adding two high-pressure holders at Santa Monica, California.

The 200-mile Magnolia Gas Company line from the Bruni fields in South Texas to New Braunfels, near San Antonio, was announced.

Northern States Power Company occupied its new general office building in Minneapolis, Minnesota.

The Moran Corporation sold its North Louisiana and Arkansas properties to the Arkansas Natural Gas Corporation.

The Oil and Gas Association of Alberta, Canada, was organized.

Control of the Little Rock Gas and Fuel Company, Little Rock, Arkansas, passed to the Arkansas Natural Gas Corporation.

Houston Gas and Fuel Company announced plans for a new office structure at Houston.

June

Southern California Meter Association entered its third year, electing J. J. Delaney as president.

Northwestern Utilities Company of Edmonton, Alberta, planned to loop its main line to Edmonton between Viking and Holden, and to enter upon further drilling operations.

Natural gas from Lea County, New Mexico, fields was received at El Paso with completion of the 200-mile El Paso Natural Gas Company line.

Louisiana Gas and Fuel Company, a merger, consummated plans for consolidating properties of various operators in northern Louisiana to supply gas reserves for the Mississippi River Fuel Corporation line to St. Louis, Southern Natural Gas line to Birmingham and Atlanta, and Interstate Pipe Line Company line to Baton Rouge and New Orleans. N. C. McGowan, vice-president of Palmer Corporation, was named president of the merged company.

A permanent working industrial gas exhibit in Los Angeles was planned by the Natural Gas Bureau, representing Los Angeles Gas and Electric Corporation, Southern California Gas Company and Southern Counties Gas Company.

Kansas Pipe Line and Gas Company applied to serve in 11 additional Kansas Counties.

A 38-mile loop line was projected for Oklahoma Natural Gas Corporation between Coleman and San Angelo, Texas.

Pacific Gas and Electric Company inaugurated an industrial gas salesmen's course in charge of J. H. Gumz.

A 50-mile pipe line extension to northeastern Kansas and as far into Nebraska as Falls City, was planned by Gas Service Company.

Federal and Provincial commissions began study of gas conservation in Alberta fields of Canada.

El Dorado properties of the Industrial Gas Company were purchased by the Arkansas Natural Gas Company.

July

Lone Star Gas Company launched construction on its 135-mile line from Petrolia to Fort Worth and Dallas, Texas.

The Gas Appliance Society of California conducted a water heater drive.

Central States Natural Gas Company was organized to acquire natural gas reserves in the Texas Panhandle for a line to Chicago. Contract was reported let for $18,000,000 worth of pipe.

Pecos Valley Gas Company's line to Roswell, New Mexico, was finished.

Littleton-to-Boulder extension of Colorado-Wyoming Gas Company from the Amarillo-Denver line was begun.

Cities Service Gas Company made plans to lay a 50-mile extension from Petrolia, Kansas, to Ft. Scott.

Pacific Gas and Electric Company announced new service structures to be built in San Francisco, at a cost of $1,000,000.

Portland Gas and Coke Company purchased the Salem, Oregon, plant of the Portland Electric Power Company.

August

Cooperative advertising was launched on the Pacific Coast under the auspices of the Pacific Coast Gas Association.

W. B. Foshay Company dedicated Foshay Tower in Minneapolis, Minnesota.

Nebraska Natural Gas Company announced a project to bring Texas gas to Nebraska as far east as Des Moines.

Five holders were under construction for the Pacific Gas and Electric Company ranging from 100,000 to 500,000 cubic feet capacity.

The Graf Zeppelin, Germany's giant dirigible, moored at Los Angeles on its world flight and was refueled with natural gas by the Southern California Gas Company.

Plans for a 300,000,000 cubic feet daily capacity gas line to Chicago from the Texas Panhandle, were formulated by Cities Service Company.

Los Angeles Gas and Electric Corporation opened its new office in Alhambra, California.

Northwest Natural Gas Company started construction on lines to four Washington communities, this being the first natural gas development in that state.

Pecos Valley Gas Company surveyed a 135-mile pipe line route from Artesia fields to Clovis, New Mexico.

San Diego Consolidated Gas and Electric Company planned a new structure to house plant offices and warehouses.

Pacific Gas and Electric Company inaugurated its advertising campaign in national magazines, describing advantages of natural gas to industry in northern California.

A high pressure line to bring gas from the Portland Gas and Coke Company plant to Salem through the Willamette Valley was begun.

September

Magnolia Gas Company finished its 235-mile line from Bruni fields to San Antonio and New Braunfels.

The 36th Annual Convention of the Pacific Coast Gas Association met at Del Monte, California, with 381 registered in attendance. F. H. Bivens was elected president.

California's Natural Gas Conservation Law became operative September 1.

Natural gas from Wyoming fields reached Salt Lake City and other Utah communities with completion of the Western Public Service Corporation's line.

Organization of a Rocky Mountain Gas Association as a branch of a contemplated Rocky Mountain Utilities Association, was planned for at the Colorado Utility Association's 26th convention. F. T. Parks, Public Service Company of Colorado, was appointed chairman of a committee to further plans for the Rocky Mountain Gas Association.

First steps in the program for bringing natural gas to San Diego, through an 80-mile line from Huntington Beach, were taken.

R. F. Angell was named president of the Southern California Meter Association in place of J. J. Delaney, resigned.

A projected 750-mile line from Turner Valley, Alberta, gas fields to Winnipeg was announced by W. H. Herron, president of the Alberta Oil and Gas Association.

Stacey Engineering Company was formed as a holding company for Stacey Bros. Gas Construction Company, Connersville Blower Company, Wilbraham Green Blower Company.

North American Light and Power Company bought the Midwest Telephone and Power Company, owner of Western Gas Company and Western Pipe Line & Gas Company, Kansas operators.

Middlewest Utilities Company, Insull-owned, bought the United Public Service Company, operating in Oklahoma and Arkansas.

Iowa Public Service Company let contracts for a new water gas plant at Waterloo.

Portland Gas and Coke Company sold distribution rights on Gasco Motor Fuel to the Shell Company.

October

Six thousand gas men met with the American Gas Association at Atlantic City.

Standard Oil Company of California purchased the Pacific Public Service Corpora-

tion, of which Coast Counties Gas and Electric Company is a subsidiary.

Seattle Lighting Company of Seattle, Washington, was purchased by the Central Public Service Company of Chicago.

Southern California Gas Company let contracts on a 70-mile line from Kettleman Hills to a point near Taft, California.

Little Rock Gas and Fuel Company opened its new building in Little Rock, Arkansas.

Fort Worth Gas Company entered its new office structure in Fort Worth, Texas.

The Lone Star Gas Company purchased Texas Cities Gas Company, Northwest Cities Gas Company (operating in the Pacific Northwest) and other properties.

Minnesota Northern Power Company formed plans for a line from eastern Montana to Williston, North Dakota (90 miles) and to Bismarck (210 miles), both lines to be laid in the spring of 1930.

British Columbia Electric Railway Company, Ltd., completed its 3,000,000 cubic foot holder in Vancouver.

Natural gas was made available to St. Louis industries by the Mississippi River Fuel Corporation, which finished its 526-mile gas system extending from Louisiana fields.

November

The Nebraska Pipe Line Company was incorporated to lay a line in southern and central Nebraska, city distribution to be handled by Nebraska Natural Gas Company.

Salem, Oregon, received gas through Portland Gas Company's main line extension from Portland.

Natural Gas Corporation of California, Ltd., was organized with the intention of serving liquefied petroleum gas to a score of towns in San Joaquin Valley.

Kansas Gas and Electric Company of Wichita made plans for a $500,000 service building.

The Monroe-Shreveport line of the Arkansas-Louisiana Pipe Line Company (subsidiary of Arkansas Natural) came to completion.

Straight natural gas service began in San Jose, Fresno and several other northern California communities served by the Pacific Gas and Electric Company.

Murchison Oil Company bought the Arkansas Western Gas Company, serving several northwestern Arkansas towns.

The Petrolia, Kansas, to Fort Scott, Kansas, 50-mile extension of Cities Service Gas Company was finished.

Southern California Meter Association held its first annual manufacturers' exhibit.

December

Southern Natural Gas Corporation completed its line from Monroe fields, bringing gas to Birmingham and Atlanta.

The Ninth Annual Gas Meter Short Course held session at Ames, Iowa.

Gas from the Jennings field, Texas, crossed the border to Monterrey, Mexico, with the completion of United Gas Company's line.

Cities Service Gas Company finished construction on its line from Atchison to Falls City, Nebraska.

Lone Star Gas Company's 98-mile extension from Petrolia to Forth Worth and Dallas was completed.

Cimarron Utilities Company completed a 43-mile extension from Guymon and Texhoma, Oklahoma, to Beaver and vicinity.

In this hurried recapitulation of events which have made 1929 a year of advance for the gas industry of the West it has been necessary to exclude many significant facts because of space limitations. It would have been of value, for the purpose of this review, to list the hundreds of communities west of the Mississippi in which applications for gas service franchises have been made during the past 12 months. Literally scores of such franchises have been granted, and the news columns of *Western Gas* for the year past have faithfully chronicled these extensions of the gas service area.

It is apparent that the year 1929 opened up a new empire for gas in the West, and the years immediately ahead will witness an intensive development within this new territory. Meanwhile the Western industry pursues its chief present objective of linking up its market areas to natural gas supplies existing at many points in the West. The year 1930 will record new progress in this direction.

Southern Cities *in* Novel Advertising Venture

WHAT is believed to be a radical departure from public utility advertising methods has been introduced in Shreveport, La., by the Southern Cities Distributing Company, a subsidiary of the Arkansas Natural Gas Corporation. The latter is a Cities Service organization.

Using an afternoon newspaper as the medium, the company's advertising department has developed a series of stories addressed to children of the city, with no reference in the copy to natural gas—except in the signature.

Each ad is captioned: "Adventures in Storyland." All copy is written in very simple language, to be read by or for the boys and girls of Shreveport. Included in the subjects are stories of Armistice Day, how Texas Street gained its name, the legends of Caddo Parish Indians and the famous fairy tales which are condensed, yet clearly told.

Considerable research was necessary before the series was launched. The ads, each with appropriate art work, are being published three times a week on the newspaper's comic page in two-column, 12-inch space.

According to John L. Fletcher, advertising manager of the Arkansas Natural and associated companies, the company chose this form of advertising because it believes that its duty, as a distributor of natural gas, belongs first to the home. "We feel," says Mr. Fletcher, that we are accomplishing our purpose when we provide wholesome entertainment for the children and a handy bit of elementary education to answer the average parent's nightly problem: 'What story shall I tell them this evening'."

The children have already learned to look for the stories and insist that their parents read them aloud. If these unique advertisements are read with interest in the home, they should do effective service in the direction of good will for the gas company.

After three months, the stories will be combined in a booklet for distribution to all children who call at the Southern Cities' office.

JOPLIN NEW BUSINESS DEPARTMENT WINS TRIP TO KANSAS CITY

Members of the New Business Department of the Joplin Gas Company, of Joplin, Missouri, with W. E. Carden as New Business Manager, were awarded a trip to Kansas City, headquarters of Gas Service Company, over the Thanksgiving holidays. Nineteen men made the trip.

The reward was offered to the New Business Department for the sale of $60,000 in business between September 1 and November 25. The Joplin men succeeded in selling $87,632.63 in business during this period, passing their goal by $27,000.

Mr. Carden states that this contest was one of the best business getters that the company has inaugurated. The results were unusual, taking into consideration the fact that there are only 9,000 meters on the system. Eighty-five per cent of the total sales of $87,632.63 was house-heating equipment.

NEW BUSINESS MANAGERS NAMED FOR GAS SERVICE ADDITIONS

F. M. Rosenkrans, new business manager for the Gas Service Company, has announced the appointment of John R. Norris, Lloyd E. Christopher and Leslie M. King as new business managers, respectively at Hiawatha and Horton, Kansas, and Falls City, Nebraska, new towns recently added to the Gas Service system. Gas will be served these towns through a gas line being brought to completion, extending from the Cities Service Gas Company line at Atchison, Kansas, to Falls City, Nebraska.

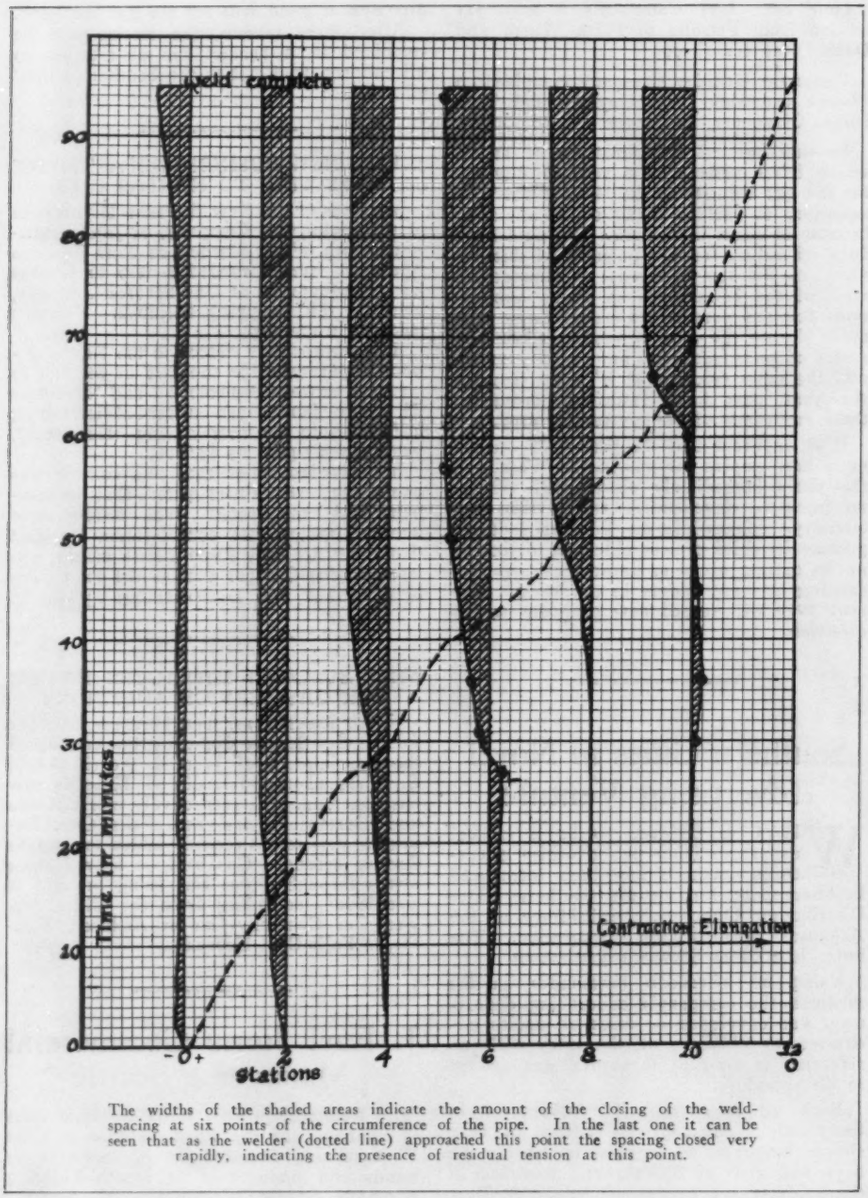
J. Earl Jones Commercial Manager *at* Seattle

IN December J. Earl Jones, assistant sales manager of the Portland Gas & Coke Company, accepted an appointment as commercial manager of the Seattle Lighting Company, Seattle, Washington. He assumes his new duties January 1.

The Central Public Service Corporation of Chicago recently purchased the Seattle utility.

J. Earl Jones

Mr. Jones, who is this year serving as general chairman of the Pacific Coast Gas Association's Commercial Section, was graduated from the University of Oregon in 1912, and entered the employ of the Portland Gas & Coke Company the same year. Beginning as timekeeper he has served with the Portland utility almost continuously, being made assistant sales manager in 1921. He has taken a leading part in Portland civic enterprises, being president of the governing board of the Hinson Memorial Baptist Church, a director of the Oregon Building Congress, and active in other fields.



The widths of the shaded areas indicate the amount of the closing of the weld-spacing at six points of the circumference of the pipe. In the last one it can be seen that as the welder (dotted line) approached this point the spacing closed very rapidly, indicating the presence of residual tension at this point.

Fig. 4

Data *on* Residual Welding Stresses

(*Continued from Page 34*)

no doubt that this original deposit is under compression.

Since residual welding stress is due to contraction of metal during cooling it is reasonable that the line of deposited metal should be as narrow as possible. In some localities specifications for pipe-line butt-welds have demanded a weld of great width, the line of the weld to be as much as 1.25 inches wide when welding 0.25-inch steel. My own contention is that this is exactly opposite to proper procedure and that the weld should be as narrow as possible. The viewpoint that the greater width makes for more perfect bonding is not tenable.

It should be pointed out that while residual welding stresses may be high the deformations required to relieve those stresses will be small if the regions of such stresses are small. It is impossible by any of the known processes of welding to deposit a metal which is as ductile as the parent metal. It is therefore necessary to make the weld have 100 per cent strength over the regions of residual tension and cause the parent steel to take the deformation.

Present practice in pipe-line, girth butt-welding is to make the weld of 100 per cent strength. I have endeavored to show why it *must have 100 per cent strength.*

Figure 4 shows the deformations occurring during the making of a rolling weld. The deformation indicated by the changing distance between two points on opposite sides of the line of the weld was measured at a number of stations along the circumference of the pipe. We may confine our attention for the moment to what occurred at station 10.

Welding began at station zero and proceeded around the pipe to station 12, which is identical with station zero. The progress of the welder is shown by the dotted line the time of welding in minutes being indicated on the vertical axis.

At station 10 the width of the shaded area to the right of vertical indicates elongation and the width to the left indicates contraction of the distance between the two points on opposite sides of the weld. A uniform width at all of the stations might be taken to mean zero stress in the weld, merely a bodily axial movement of the whole pipe. (As yet I have never beheld such a phenomenon.) A rapid change in the deformation must be interpreted as the introduction of stress.

At 60 minutes, as the welding approached station 10, there was a rapid contraction of the distance between the measuring points. This rapid change can be accomplished only by the introduction of sufficient stress to stretch the parent steel of the pipe the amount indicated.

From observation of the deformation at stations 6, 8 and 10 it may be concluded that in general the last third, or even half, of a rolling weld is in tension and the metal deposited at the start of the welding is placed in compression.

An intrinsic property of the pipe-line, girth butt-weld is, then, that there is at least one region where residual tension is equal to the elastic limit of the metal. At least this portion of the weld *must* possess 100 per cent strength.

I hope that the results I have given may encourage others in the observation of the many difficulties encountered in welding, as it is only through a study of the difficulties that we are likely to see the means for improvement.

REFERENCES

1. A Physical Study of the Mokelumne Pipe Line, University of California Press; Jour. Amer. Water Works Assoc., 20, pp. 449-462, Oct. 1928; Western Gas, 4, pp. 186-7, Sept. 1928; Jour. Amer. Weld. Soc., 7, pp. 7-12, July, 1928; A New Development in Pipe-Line Girth Welding, Oil Field Engineer, Dec. 1928; and others.

2. The fact that a comparative study of the linear-footage failure of girth welds and girth rivets (Physical Study of the Mokelumne Pipe Line, p. 356) showed a failure of 4.44 per cent of weld and 4.54 per cent rivet failure is not believed to be a suitable criterion of the success of welding. I am convinced that we can now weld pipe lines of any diameter so that girth weld failures just never happen.

3. I am speaking of a girth weld which is as yet not necessarily a part of a completed pipe line; therefore other constructional stresses and operating stresses are not considered.

4. From "A Physical Study of the Mokelumne Pipe Line," p. 318.

SAFETY COUNCIL ORGANIZED BY ARK. NATURAL PROPERTIES

Walter Hopper and J. C. Hamilton are president and secretary, respectively, of a safety council recently organized by the North Louisiana and Arkansas properties of the Arkansas Natural Gas Corporation.

The Safety Division of the Mid-Continent Oil and Gas Association assisted in the formation of the council. Local councils of the Arkansas Natural properties will be formed at Pine Bluff, Little Rock, El Dorado, Hope and Texarkana, Arkansas, and at Homer, Vivian, Monroe, and Tullos, in Louisiana.

Liquefied Petroleum Gas *as an* Enricher *for* Blue Gas *in* Place *of* Gas Oil

pressures are equalized between the tank and the holder.

We have gone more or less into detail in this regard as this will serve as an explanation of how we unload the butane tank cars. The second case represents the tank car and the first case represents the storage tank. By removing vapors from the top of the storage tank a refrigerating action is obtained in that tank, which lowers the temperature and consequently the pressure in that tank. The pressure in the tank car is not materially lowered and consequently the liquid will continue to flow from the tank car to the storage tank as long as there is a difference in pressure between these two tanks. This is the method used in unloading tank cars of G-4 into the storage tank.

If pure butane gas were put into a pipe, it will be seen that it will continue to exist in the gaseous state as long as the temperature is maintained above 15° F. If, however, the temperature at any part is reduced below 15° F., the butane gas will condense into a liquid state. This has given rise to the question in the minds of some gas men as to whether or not the butane gas would remain in the gaseous state in the gas mains when subjected to temperatures lower than 15° F. or if subjected to pressures such as might exist in the gas property using high pressure mains

As an example of what may be expected under various conditions let us assume that we have a mixture of blue gas and butane gas consisting of 90 per cent of blue gas and 10 per cent of butane gas, which is about what would be obtained with a 550 B.t.u. gas made up of blue gas of about 260 B.t.u. and butane vapors. Let us assume now that this gas is subjected to a pressure of 10 lbs. per sq. in. gauge and to a temperature of 0° F. The absolute pressure of this gas would then be approximately 25 lbs., and according to the laws of partial pressure the actual vapor pressure exerted by the butane would be 10 per cent of this 25 lbs., or 2½ lbs. The vapor pressure of butane at 0° F. is approximately 10 lbs. absolute. It will readily be seen therefore that the butane would not condense out under these conditions as the vapor pressure exerted by the butane in the mixture is only 2½ lbs., whereas the natural vapor pressure at 0° F. is 10 lbs. It is therefore readily seen that no trouble from condensation of the butane in the gas mains would be encountered under ordinary conditions.

The oil efficiency as obtained in regular oil operation under good operating conditions is generally conceded to be somewhere between 95,000 B.t.u. per gallon and 110,000 B.t.u. per gallon. The actual efficiencies are of course very difficult to obtain, as in calculating the oil efficiency of a water gas set there are so many assumptions that have to be made. In the first place it is necessary to determine either by experiment or to assume the volume of gas produced by one gallon of oil. This volume is taken in the usual oil efficiency determination at from 55 cu. ft. of gas per gal. of oil, to 70 cu. ft. of gas per gal. of oil, and no doubt

(*Continued from Page 38*)

there is justification for figures anywhere between those two volumes. This will depend to a very large extent on the make-up of the oil which is being used and the temperatures under which the oil is cracked.

The second assumption which must be made is the B.t.u. value of gas made in the generator. This is also a very difficult thing to determine in oil operation, especially where soft coal is used for generator fuel. Of course, samples taken from the top and bottom of a generator showing the up- or down-run will give an indication of the quality of the blue gas made during the steam-run both up and down. It is also possible of course to get a sample of gas during the blow-run, which will give some idea of the quality of the gas made during that portion of the cycle. However, even if we go to the trouble of taking these three gases independently and determining their qualities, we still do not know the proportion of the gases to the total, so that it is still difficult to arrive at any very definite conclusion as to the make-up of the average gas coming from the generator. Under these conditions, therefore, it is rather difficult to determine definitely the oil efficiency in oil carburetion of water gas. In the case of butane carburetion all the B.t.u. available in the liquid is also available in the gaseous state, and therefore we know definitely that the so-called "oil efficiency"' in this case will be 102,400 B.t.u. per gal.

Off hand we would say that the amount of butane required per 1,000 cu. ft. of gas would be about the same as that required for oil to produce the same B.t.u. from a mixture of blue gas of a given B.t.u. This, however is not the case, due to the fact that the volume of butane gas is considerably less than the volume of oil gas produced from a gallon of oil. This fact results in a larger proportion of blue gas in the total finished gas in the case of butane carburetion than is true in the case of oil carburetion. In order that this point may be clear, let us work out a concrete example:

Assume a generator gas of 280 B.t.u.
Oil efficiency of 102,400 B.t.u. per gal.
Volume of oil gas per gal.....63 cu. ft.
B.t.u. of finished gas.....550

Then

The B.t.u. of the oil gas is

$$\frac{102{,}400}{63} = 1625$$

Now let x equal the volume of oil gas per M then

$$1625x + 280\ (1 - x) = 550{,}000$$

from which x = 204 cu. ft. of oil gas.

$$\text{or } \frac{204}{63} = 3.23 \text{ gals. of oil per M.}$$

Now let us assume we mix this same 280 B.t.u. blue gas with butane to obtain the same B.t.u. of finished gas. We have

Oil efficiency 102,400
Volume of gas per gallon.....32 cu. ft.
B.t.u. of finished gas.....550
B.t.u. of butane gas.....3200

Let x equal volume of Butane gas per M. Then

$$3200x + 280\ (1 - x) = 550{,}000$$

From which x = 92.5 cu. ft.

$$\text{or } \frac{92.5}{32} = 2.89$$

In the case of oil carburetion we have a gas composed of 204 cu. ft. of oil gas of 1625 B.t.u. and 796 cu. ft. of blue gas of 280 B.t.u. per M.C.F. or 20.4 per cent oil gas by volume and 79.6 per cent blue gas

In the case of butane carburetion we have a gas composed of 92.5 cu. ft. of butane of 3200 B.t.u. and 907.5 cu. ft. of blue gas of 280 B.t.u. or 9.25 per cent by volume of butane and 90.75 per cent of blue gas.

It will readily be seen that in the case of oil carburetion the B.t.u. supplied by the blue gas is .796 × 280 = 223 B.t.u. per cu. ft. of finished gas and oil supplies 550 — 223 = 327 B.t.u.

In the case of butane carburetion the blue gas supplies .9075 × 280 = 254 B.t.u. per cu. ft. of finished gas and the butane 550 — 254 = 296 B.t.u.

The reduction in gallons of butane per M over gallons of oil per M is not clear gain since we must make 907 cu. ft. of blue gas per M of finished gas where with oil we only made 796 cu. ft. To get at the effect of this let us make some further calculations. Say for instance that the particular plant in question were operating on oil with 30 lbs. of fuel per M and the 3.23 gallons of oil.

The fuel per M of blue gas would then be

$$\frac{30}{.796} = 37.7 \text{ lbs.}$$

The fuel per M of finished gas with butane carburetion would then be

$$37.7 \times .907 = 34.2 \text{ lbs.}$$

We have then sacrificed 4.2 lbs. of fuel to save .34 gallons of oil.

The matter of capacity is also involved since the set capacity is dependent on the amount of blue gas the machine will make. Since 796 cu. ft. of blue gas are required per M of finished gas with oil and 907 cu.ft. of blue gas per M of finished gas with butane let us calculate the reduction in set capacity.

Let x = the machine capacity with oil; then .796x = blue gas capacity.

Then the finished gas capacity with butane would be $\frac{.796x}{.907}$ or .878x. The capacity in finished gas is then 87.8 per cent as much with butane as with oil or we have 12.2 per cent reduction in set capacity.

The above figures are based entirely on the assumption that the operation of the set as a blue gas machine will produce the same quality of blue gas and the same fuel results as were obtained with oil operation. However, it is entirely possible to increase the make by the use of additional blow-run.

An increase in blow-run will accomplish the double purpose of increasing the set capacity and decreasing the fuel per M cu. ft. of gas made. It will of course result in a lower B.t.u. of blue gas which in turn will require a larger amount of butane to enrich this gas to the requred B.t.u. It is entirely feasable to increase the blow-run sufficiently to completely recover the larger capacity as stated above and also reduce the pounds of fuel per M cu. ft. of gas made to about the same figure as that which would result with oil carburetion. The proper balance of fuel and butane proportion can thus be worked out to obtain the lowest cost for gas made, taking into consideration all of the factors above.

We might bring out at this point the effect on the gravity of the finished gas with the blue gas butane mixture. The increased blow-run will of course increase the gravity of the blue gas somewhat and of the finished gas. The gravity will be further increased due to the larger proportion of butane gas in the mixture inasmuch as butane gas has a gravity of 1.95.

Another point which must not be overlooked in calculating the relative results with butane or oil carburetion, is the tar residuals credit which is obtained with oil operation. In making blue gas with coke there would be absolutely no tar produced at all in the process and the entire tar credit would be lost. In the making of blue gas with bituminous coal there should theoretically be some small amounts of coal gas tar available, unless this coal gas tar is cracked in the checkerbrick chamber. If it is cracked it forms additional gas. We are inclined to believe from our experience that this latter is the case and that practically no coal gas tar of any value is to be recovered.

DAVENPORT INSTALLATION

So much for the theoretical considerations and problems involved in the use of butane. Let us now consider for a moment the actual installation of equipment and the results which have been obtained in Davenport.

Fundamentally the equipment required consists of storage tanks with the necessary piping, means for vaporizing the butane liquid and means for introducing it into the blue gas. At our plant there were installed four 8-foot x 32-foot cylindrical tanks constructed under the specifications of the A.S.M.E. Boiler Construction Code for a working pressure of 80 lbs. per sq. in. tested to 13 lbs. hydrostatic pressure. These tanks have a total combined capacity of approximately 45,000 gals., leaving a due allowance for necessary gas space. These tanks are filled from the tank cars by means of pressure differential as described previously. The piping from the tanks is so arranged that gas can be taken from the top of the tank or liquid taken from the bottom of the tank. The liquid line leads through a pressure reducing valve to what we call the heat exchanger which is in fact a small condenser, butane liquid being led into it in the space surrounding the tubes through which hot water or steam is circulated. The hot water or steam provides the latent heat of vaporization and gasifies the liquid. From the heat exchanger the gas is led through a pressure regulating valve, a small Connersville rotary displacement meter, a differential pressure regulating valve, a motor operated butterfly valve and then to the blue gas line. The function of these various regulators is as follows: The liquid pressure reducing regulator reduces the pressure so that the gas may be more easily vaporized and maintains a pressure of about 3 to 4 lbs. on the heat exchanger. The gas pressure regulating valve reduces this pressure to constant pressure of 1½ lbs. at which pressure the gas is metered. The differential pressure regulator is so adjusted as to maintain a constant differential pressure across the butterfly valve. This butterfly valve is motor operated through relays from the recording calorimeter and quick acting control. The butane is introduced into the blue gas at a point just ahead of the exahuster so that the gas passing through the exhausters, washer cooler, purifiers, station meter, etc., is the mixed gas ready for use. The recording calorimeter is operated from the mixed gas at the meter. The quick acting control is operated from a small gas line taken directly at the outlet of the exhauster. The gas is pumped through this small line by means of an auxiliary exhauster or booster to the quick acting control burners, the object being to get the gas to the quick acting control as rapidly as possible. The quick acting control is in effect a calorimeter which does not take into account corrections for temperature and pressure. This outfit operates the electrical relays which open and close the butterfly valve on the butane gas line. It is connected through the regular recording calorimeter in such a way that the calorimeter corrects the action of the quick acting control so as to maintain a constant B.t.u. value of the gas. This apparatus is not particularly designed for the use of butane blue gas mixtures but has been designed to take care of all problems of gas mixing. We might say here that this apparatus has not been entirely successful in its functioning and that we do not consider it essential to the operation of butane. The butane can be introduced into the relief holder by the gas maker by having the butatne meter installed on the operating floor and having the operator put in the required number of cu. ft. of butane per run. This system was used quite successfully at Lincoln, Neb., during a temporary use of butane last summer. We were inclined largely to the proposition of mixing the butane with the blue gas as it was pumped from the relief holder to the storage holder so that we would have an opportunity to study the characteristics of the blue gas which was being produced. The gas in the relief holder is gas which was made in the generator and is, of course, an average sample of the uprun, downrun and blowrun gases. Analyses and B.t.u. tests can be made and for experimental work we find this has aided us in determining the proper cycle for use on a machine.

We have tried various operating cycles and have been able with soft coal for generator fuel to produce a blue gas of about 310 to 315 B.t.u. when operating with very little or no blowrun. We have also gone to the other extreme and made blue gas of as low as 240 B.t.u., in which case our capacity and fuel results were good, but the butane required for enrichment was too high for economical operation; also, the gravity of the gas is too high without burner adjustment. On the average we have made blue gas of about 260 to 270 B.t.u. value which we have found to give us about the most economical balance. We show in table form a comparison of average monthly results, comparing oil enrichment during the month of March with butane enrichment during the month of May (1928).

	March Oil	*May Butane*
Lbs. generator fuel per M cu.ft.	35.9	33.8
Gals. enricher per M cu.ft.	2.92	2.93
Make per set hour in cu.ft.	86,000	79,600
B.t.u. of gas per cu.ft.	545	540
Lbs. boiler fuel per M cu.ft.	7.6	3.8

A typical analysis of the two gases during the above two months was:

	Oil	*Butane*
Carbon dioxide	5.0	4.8
Illuminants	9.7	.6
Oxygen	1.2	1.0
Carbon monoxide	23.5	26.7
Hydrogen	25.	29.7
Methane	12.3	2.8
Butane		8.8
Nitrogen	23.3	25.6
	100.0	100.0

During the months of the comparison the generator fuel was very largely Illinois coal. These tablets will give some idea of the comparative actual operation as between oil and butane. In this connection it is interesting to note the decrease in boiler fuel which is due to the increased steam made in the waste heat boilers when operating with butane. This increased steam we figure just about balances our loss in the sale of tar residuals.

NAPHTHALENE FORMATION

Surprisingly few difficulties were encountered in the operation of the plant. We have run into one problem, however, which we have not yet solved and which is one we least expected to have trouble with, that is, the production of naphthalene. In operating carbureted water gas sets, the control of naphthalene production is very largely a matter of control of the carburetter and superheater temperatures and naphthalene has never been considered a serious problem in water gas manufacture. We found, however, that in making blue gas with soft coal for generator fuel, considerable quantities of naphthalene are produced apparently from the volatile matter in the coal passing through the hot checker brick chamber. This was not at first apparent, and we did not run into naphthalene difficulties until after we had been operating on butane for about six weeks. We then made tests both at the outlet of the storage holder and on the gas in the relief holder. Very much to our surprise we found a very high naphthalene content in the blue gas in the relief holder. We have had naphthalene tests show as high as 23 grains of naphthalene in the relief holder. The naphthalene at the outlet of the storage holder was not found to be that high at any time, but we have had tests running as high as 11 and 12 grains. We then made some tests on the gas in the relief holder at Moline with oil carburetion and found that here too the naphthalene content was high, running about 22 grains. At the same time that we had the 22 grain in the relief holder at Moline, however, we had practically no naphthalene at all at the outlet of the storage holder. We attribute this to the scrubbing action of he light oils, which condense out in passing through the plant, and be-

lieve that these oils deposited in pipe lines, condensers, purifying material, etc., act on the gas to scrub out the naphthalene content. This probably also explains why we did not run into naphthalene troubles until after operating with butane for several weeks, as the drip oils were at first present in the apparatus through the plant and continued to exercise a scrubbing action until they were finally all vaporized and taken up by the gas passing through them.

We have attempted several methods of getting rid of the naphthalene trouble, namely, through control of heats in the carburetter and superheater, running the heats both very high and very low, in one case attempting to crack the naphthalene, and the other, attempting to get low enough so it will not be forced. To date we have not succeeded in eliminating the naphthalene trouble by introduction of drip oils, but this apparently has not as yet been successful either. We have run tests on the blue gas at the outlet of the generators, i.e. between the generator and the carburetter and find that the naphthalene content at this point is very low and believe that if connections were made to the set so that the gas would be led from the generator directly to the washbox wihtout passing through the carburetter and superheater, that our naphthalene troubles would be solved. This will, however, involve considerable expense, and the operation in this manner has not yet been attempted.

We did not find the increase in gravity of the gas was sufficient to necessitate changes of burner adjustment. There have been, however, indications that the increased gravity has increased the pressure drops in our distribution system.

NO CHANGE IN GAS COSTS

So far as we can tell at this time there has been very little or no change in the cost of producing gas as between oil operation and butane operation, assuming the same price per gallon for both oil and butane. The final effects of the change, with regard to distribution problems, etc., we have not as yet been able to ascertain. The action of the butane carburetted gas on meter diaphragms is a quuestion which we have considered somewhat suspecting that probably there would be a tendency to pick up the oils from the meter diaphragm, thus causing greater meter maintenance. To date we have noticed no indication of this feature. There is also the possibility that the lack of oily substance in the gas will lead to greater interior deterioration of gas mains and services. On this feature we have, of course, not as yet been able to obtain any data.

In conclusion, let us again quote from Mr. Thomas' paper in which he summarizes the advantages and the disadvantages of the process as follows:

Factors to be Considered in Evaluation of Process.

A. Advantages.

1. Constant quality enricher.

2. One hundred per cent thermal efficiency. No heat required for cracking.

3. Flexibility, ability to care for peak- and over-load conditions.

4. No accumulation of light oils, naphthalene, gums or resins in mains. No B.t.u. drop in mains. Will remove old deposits, increasing pipe line capacity and decreasing service complaints and expenses.

5. More waste heat avaliable, less boiler fuel required.

6. Lowered set maintenance cost reduces recheckering.

7. Decreased purification costs.

8. Decreased enricher handling costs. No oil pumps or heaters required.

9. Opportunity to study generator operation, thereby increasing efficiency.

B. Disadvantages.

1. Increased cost of enricher storage, duplication of equipment on plants now operating on gas oil.

2. Decreased gas-making capacity of set. A greater per cent of gas made from coal.

3. No light oil or tar credits.

4. A slight increase in gravity of gas.

Until the one-year commercial test at Davenport is completed and final conclusions drawn, it will obviously be impossible to accurately evaluate the above factors, and to strike an economic balance between gas oil and commercial butane for water gas carburetion. The results will supply interesting material for a possible future paper.

CONCLUSIONS

1. At the present extremely low gas-oil price levels, commercial butanes seem, on the basis of the meager data at present available, competitive at a common price per gallon for water gas enrichment.

2. The new enricher will become of proportionately greater worth to the industry as the general price structure of enricher fractions ascends.

3. Satisfactory and practical mechanical means for handling, mixing, and controlling liquefied petroleum gases in gas plants have been worked out and are available to the industry.

4. The use of these recently available liquefied gases as the sole raw material for economical gas manufacture with consequent reduction in labor and production costs at small properties should be given serious consideration by the industry.

5. The competitive nature and large available quantities of liquefied gases suitable for replacement of manufactured gas in large industrial uses creates a situation that can perhaps be solved only by the increasing use of these fuels by the gas utilities as enriching mediums, and in the complete manufacture of gas at properties having low send-outs.

Lone Star Public Relations Program Full *of* Variety

By Leslie N. Neighbors

Public Relations Department
Lone Star Gas Company

PICTURE shows, and a dancing chorus, public speaking and a quartet—mixed in with advertising, running a company publication and promotion of general get-together luncheons—make up the life of a public relations man for the natural gas company of today. At least such is the case in the public relations department of the affiliated natural gas companies known as the Lone Star group, with headquarters in Dallas, Texas.

One of the department's first ventures into features to bring the company before the public was a moving picture of construction work on a new 100-mile line of 20-inch pipe coming down from Petrolia, Texas, into Dallas. This picture has been shown at several noonday luncheon clubs as well as at various company gatherings.

The original film resulted in so many favorable comments that the department has now undertaken the making of 250 feet of film showing advertising copy playing up various features and activities of the company from the building of a new bridge spanning the treacherous Red River between Texas and Oklahoma to a series devoted to "Stargas," a compressed natural gas being marketed by the companies.

In its program to extend contacts with the public and thus better the understanding and relations existing between the consumer and the company, the department is working on a number of features which it is presenting before such organizations as luncheon clubs, Rotary and Lions Clubs, high school and college gatherings.

Local managers are often called upon to assist in the development of various civic programs, and may now call to their assistance the aid of a member of the public relations department, who in turn presents a history of the company's activities, both in the city and over the territory. Sometimes his talk is illustrated with the motion picture. It is the aim of the department in time to gather information on the industry for use by employees and managers over the system in presenting public talks.

Another feature presented at luncheons and on other programs is the Blue Blaze Quartet. The four boys making up this group were selected from different departments in the general offices.

A dancing chorus is the newest venture sponsored by the department—so new, in fact, that its first appearances were scheduled during December. The chorus consists of six girls working in various departments, who have been training under a member of the secretarial force in the legal department. Their first number was a Spanish chorus presented at an inter-company entertainment on December 7. In addition to the chorus of six, there are several girls training for other numbers which will be used in the future. Girls who do not wish to appear on the programs are given instructions in rhythm and physical culture.

Fort Worth Gas Co. Wins Important Decision

FORT WORTH Gas Company, through a decision rendered in the United States District Court for the Northern District of Texas, has been sustained in its exceptions to three findings of a Special Master appointed after the gas company had come into court to enjoin the City of Fort Worth from interfering with a rate increase, application for which had been denied by the state railroad commission.

These three findings which were overruled were to the effect that 2 per cent of the fair value of the property is a reasonable annual charge for depreciation; that returns should not be allowed on what the Master stated was an unusually large increase in capital additions not yet productive of revenue; and that the periods ending in 1928 and the calendar year 1928 were abnormal and not a reliable criterion of the sufficiency of the existing rates.

The court held that within the meaning of the law a sum sufficient to constitute just compensation for the use of the property employed in furnishing the service, is a reasonable rate of return which must be made on the value of the property at the time of the investigation and for a reasonable time in the immediate future; that 3.6 per cent of the rate base or 4 per cent on the value of the physical property is a reasonable annual depreciation allowance, and that in the absence of a finding that money was deliberately employed in useless investment for the purpose of affecting a rate decision, the court would be unwarranted in ignoring such increased investment.

UNITED GAS BUYS COMMON STOCK OF CONSOL. GAS UTILITIES

Press reports announce the acquisition by the United Gas Company of approximately 51 per cent of the common stock of the Consolidated Gas Utilities Company, with headquarters at Oklahoma City, which serves gas in about 50 towns and cities in western and northern Oklahoma, and central and southeast Kansas. The company operates approximately 1,000 miles of gas transmission line.

Forty-four per cent of the common stock of the Consolidated was said to have been purchased by the United Gas Company and seven per cent by the American Utilities and General Corporation, an affiliated company.

SO. NATURAL TO SUPPLY GAS FOR BIRMINGHAM, ALABAMA

The contract between the Southern Natural Gas Corporation, and the Birmingham Gas Company and Industrial Gas Corporation, by which the last two companies are supplied natural gas for delivery in Birmingham, Bessemer and outlying districts, has been approved by the Alabama Public Service Commission. The Birmingham district is expected to consume approximately 2,500,000,000 feet of natural gas during the first year, increasing to 4,000,000,000 feet by the fourth year. Gas will be delivered in the district about January 1.

NATURAL GAS REGIONAL SALES COUNCIL IN FEBRUARY

A new departure in American Gas Association Commercial Section service is the Natural Gas Regional Sales Conference to be held in Pittsburgh, Pennsylvania, sometime in February. Tentative dates have been set as February 10 and 11. The Conference will be similar to the Regional Sales Conferences which have been sponsored by the Commercial Section of the A. G. A.

SPRINGFIELD GAS AND ELECTRIC CO. ANNOUNCE 1930 PLANS

The Springfield Gas & Electric Company and the Springfield Traction Company of Springfield, Missouri, have announced through A. E. Reynolds, vice-president and general manager of the two concerns, the proposed expenditure of $600,000 for improvements during 1930. Approximately $400,000 of this will be spent in the construction of natural gas mains and storage tanks, it was announced, providing that a 20-year natural gas franchise which the company seeks is granted.

PUBLIC SERVICE CO. OF COLO. REPORTS ACTIVE 12 MONTHS

The Public Service Company of Colorado, according to a statement by Roy G. Munroe, has had an unusually active 12-months period, ending November 1. During this time the company has sold and installed gas-consuming appliances on the Denver mains totaling $1,198,387, or more than $16.00 per consumer. Gas consumption per Denver consumer has increased 84 per cent above the M.c.f. of the corresponding period a year ago. The company is now heating with natural gas more than one seventh of all dwellings in the City of Denver.

HORTON AND HIAWATHA, KANSAS NOW BEING SERVED

Gas was turned into the mains at Horton and Hiawatha, Kansas, late in December, through the Cities Service Gas Company line being constructed northward from Atchison, Kansas, to Falls City, Nebraska. Gas will be served to consumers at Falls City shortly after January 1.

The Cities Service Gas Company is also bringing to completion a line from a point south of Joplin, east to Springfield, Missouri, Monett, Pierce City, Marionville, Aurora, Republic, Billings and Springfield will be among the cities served through this line.

KANSAS TOWNS TO BE SUPPLIED BY SUNFLOWER NATURAL GAS CO.

A new contract has been signed, according to press reports, between the Sunflower Natural Gas Company of New York and gas producers in the St. Paul, Kansas, field.

The company recently completed a line from the field to Parsons, Kansas, and plans another to Fort Scott. The right of way has already been obtained for this latter line. The company has also secured franchises in Nevada, Iola, St. Paul and other small towns in this district.

PACIFIC PUBLIC SERVICE GETS FRANCHISES IN SAN JOAQUIN

Pacific Public Service Company, controlled by Standard Oil Company of California, on November 29 acquired the franchises held by Consumers Gas Company in the towns of Newman, Patterson and Los Banos, on the west side of the San Joaquin Valley. The transaction was for cash, for the franchises only, no physical properties being involved.

LOS ANGELES GAS AND ELECTRIC PASADENA OFFICE OPEN IN FEB.

The Pasadena office of the Los Angeles Gas and Electric Corporation, now under construction in the new Civic Center of Pasadena, California, is scheduled to be completed and ready for occupancy about February 15, 1930. The new building will cost approximately $200,000.

Carbon Black Export Ass'n Formed *by* Producers

THE Carbon Black Export Association, Inc., composed of companies producing more than 92 per cent of the world's output of carbon black, has recently been organized under the corporation laws of Delaware, for the purpose of promoting carbon black in foreign markets.

Officers elected to serve the association are Norman Lee Smith of Binney & Smith Co., president; Edmund Billings of Godfrey L. Cabot, Inc., vice-president; R. G. Greef of R. W. Greef & Co., Inc., secretary; G. A. Williams of United Carbon Co., treasurer; H. W. Huber of J. M. Huber Co., assistant treasurer. This group will constitute the board of directors of the association together with John W. Herron of Palmer Gas Products Corp., who was also appointed to the board.

Companies who are members of the association are: Binney & Smith Co., representing Columbian Carbon Co., Coltexo Corp., Keystone Carbon Co. and Texas-Louisiana Carbon Black Co.; United Carbon Co., including its subsidiaries, Kosmos Carbon Co., Eastern Carbon Black Co.; and Crystal Carbon Co.; Godfrey L. Cabot, Inc., including Texas Elf Carbon Co., Cabot Co., Cabot Carbon Co., and Gas Products Co.; J. M. Huber, Inc., including J. M. Huber Co. of Louisiana, Inc., Ebony Carbon Co., Weston Carbon Co. and J. M. Huber Pigment Co.; the Palmer Gas Products Corp., representing the associated carbon black interests of the Palmer Corp., and Electric Bond & Share Co.; and R. W. Greef & Co., Inc., representing Texas Carbon Industries, Inc.

CALIF. NATURAL GAS PRODUCTION TOTALS $22,260,947 IN 1928

A report of the Research Department of the California Chamber of Commerce released late in December, states that the total value of mineral production in California for 1928 was $332,714,233, as compared to $366,781,394 for 1927.

Mineral fuels, the leading group, contributed 75.8 per cent of the aggregate value of all minerals produced in the State during 1928. Petroleum output was valued at $229,998,680 or 69 per cent of the State's total value. Natural gas was estimated at $22,260,947 or 6.7 per cent of the aggregate.

CONSUMERS NATURAL GAS AND POWER CO. TO EXTEND LINE

A preliminary survey has been made by the Consumers Natural Gas and Power Company, of Brady, Texas, for the construction of a gas line extending from Brady to Rochelle, Richland Springs, San Saba, Lometa and Lampasas. The company now has a 42-mile gas line extending from the Jane Ellen field in Brown County to Brady.

OTTO NEISSER, RUUD DISTRIBUTOR IN SO. CALIFORNIA, DIES

Otto Neisser, for 27 years Southern California representative of the Ruud Heater Company, died at his home in Los Angeles, December 26, after an illness of over two months. Mr. Neisser was seized with an attack while on his way to Atlantic City for the 11th Annual Convention of the American Gas Association, of which organization he was a member. Returning to his home in Los Angeles the middle of November in poor health, he submitted to an operation, and passed away during the last week of the old year. His many friends in the Western industry mourn the passing of a veteran member of their ranks.

GAS-FIRED REFRIGERATOR SALES REACH 700 MARK

CLYDE H. POTTER, Commercial manager for the Southern Counties Gas Company, with headquarters at Los Angeles, California, announces that the quota of 600 Electrolux refrigerators set for 1929 had been passed early in December, and that an additional 100 had been sold. Mr. Potter also stated that the merchandise sales for the company for 1929 would reach the $800,000 mark by December 31. Despite the unseasonal weather in Southern California this fall with the temperature higher than it had been in 25 years during the same period, heating appliance sales increased 30 per cent over the corresponding period in 1928.

These facts were made known by Mr. Potter at the regular monthly sales meeting of the Southern Counties Gas Company which was held December 12. Eighty-five men were present at the evening dinner and program, carried out in holiday fashion with turkey, cards, gifts and a Christmas tree. Among the speakers were James H. Knapp, president of the company bearing his name; on industrial gas equipment; Geo. W. Smith, district manager at Santa Barbara; Captain A. C. Higgins, field representative for the A. G. A.; W. M. Couzens of the A. G. A. Laboratory; A. L. Spring, of the California Servel Company, and F. H. Bivens, vice-president of the company.

CIMARRON UTILITIES COMPLETES 43 MILES OF PIPE LINE

The Cimarron Utilities Company has completed construction of 43 miles of 4½-inch transmission line from gas wells in Guymon and Texhoma, Oklahoma, through which gas is being supplied to Hooker, Baker, Turpin, Floris, Forgan and Beaver in the same state.

1930 Calendar

Southern California Meter Association—January 23, 1930.

Pacific Coast Gas Association—Mid-Winter Conferences of Technical and Commercial Sections, Los Angeles, Feb. 6, 7, 1930.

Oklahoma Utilities Association—Tulsa, Oklahoma, March 11-13, 1930.

Arizona Utilities Association, Pacific Coast Gas Association—Joint Conference, Arizona Biltmore, near Phoenix, April, 1930.

Mid-West Gas Association—Waterloo, Iowa, April 14-16, 1930.

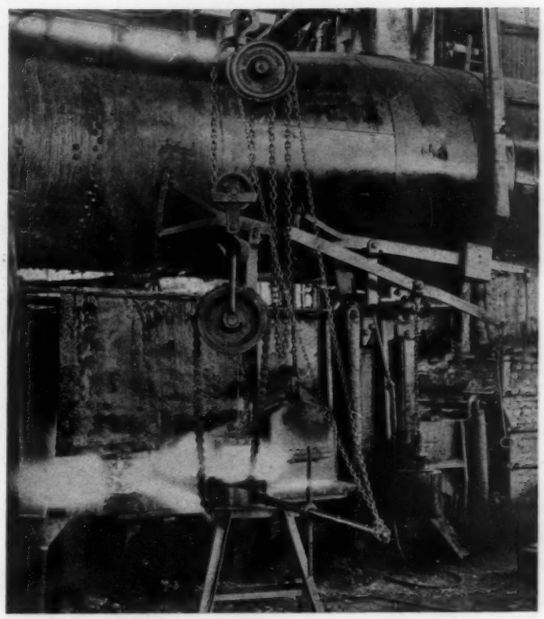
Southern Gas Association—Savannah, Ga., April 22-24, 1930.

A.G.A. Natural Gas Dept.—New Orleans, Louisiana, tentatively scheduled for May, 1930.

Canadian Gas Association—Halifax, Nova Scotia, June 24-25, 1930.

Pacific Coast Gas Association—Huntington Hotel, Pasadena, Calif., September 9-12, 1930.

American Gas Association—Municipal Auditorium, Atlantic City, N. J., October 13-17, 1930.



Gas is put to a multitude of uses by the modern railroad. The view opposite shows a 1450-pound steel billet in a gas-fired furnace at the Southern Pacific Railway shops, Los Angeles. Illustration, courtesy of the Los Angeles Gas and Electric Corporation.

Gas *is* Superior *in the* Roundhouse

(*Continued from Page 36*)

the increased volume of consumption giving the advantages of lower rates for balance of their demand, which rates are not to be attained with a more limited consumption. The superintendent of power plants will be interested if approached on this feature of the subject.

The roundhouse accommodating 10 engines per 24-hour day may be depended upon for a load of approximately 2,500,000 cubic feet of natural gas per month, larger plants using more in proportion. This consumption figure is entirely separate from the many other uses for which gas is easily proven the superior fuel in railroad shop work.

In a survey along the aforementioned lines it is in order to investigate the possibility of securing the stationary boiler and shop business on the strength of the volume involved, due to such locomotive firing and the lower rates enjoyed by the railroad as a result.

CALIF. OIL AND GAS ASS'N. ELECTS OFFICERS FOR 1930

AT the annual election of officers of the California Oil and Gas Association, held on December 19, 1929, the following officers and directors were elected:

President, Herbert R. MacMillan, general counsel and director of the MacMillan Petroleum Corporation; vice-presidents, C. S. Jones, vice-president of the Rio Grande Oil Company, and William Reinhardt, vice-president of the Shell Oil Company; treasurer, H. L. Westbrook, California Oil and Gas Association; managing director and secretary, Edwin Higgins of the California Oil and Gas Association; Assistant secretary and auditor, D. S. Kilgour.

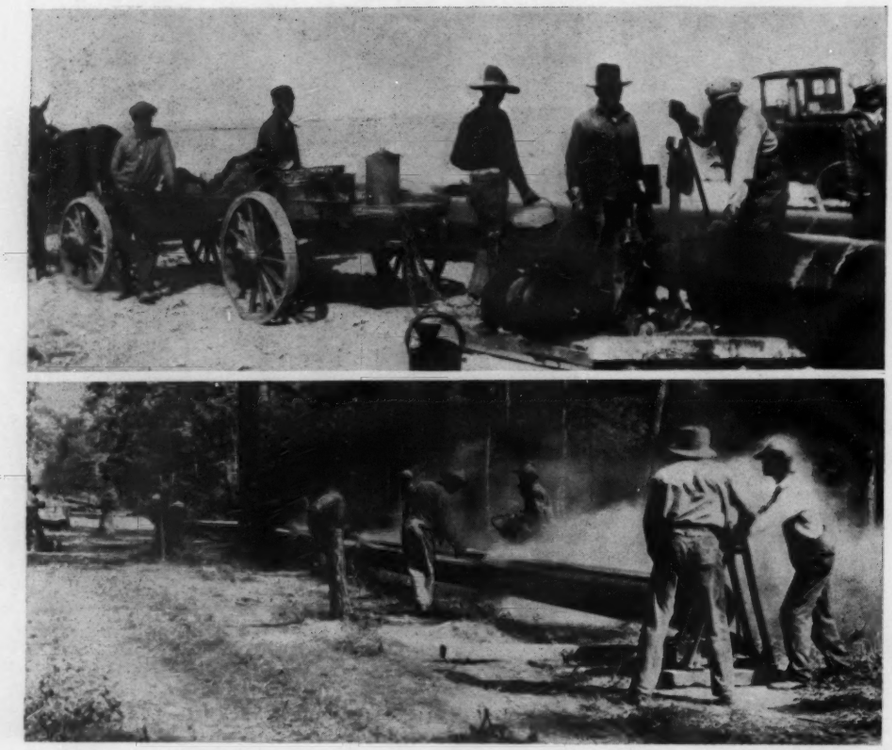
Directors: R. A. Broomfield, Barnsdall Oil Company; Chester W. Brown, Union Oil Company; R. E. Collom, Continental Oil Company; J. A. Brown, General Petroleum Corporation; J. A. Crawford, Republic Supply Company; Earle Derby, Standard Gasoline Company; W. E. Dunlap, Richfield Oil Company; J. Paul Getty, George F. Getty, Inc.; E. B. Gilmore, Gilmore Oil Company; H. Paul Grimm, Santa Fe Springs oil umpire.

S. A. Guiberson, Jr., Guiberson Oil and Investment Company; Edwin Higgins, California Oil and Gas Association; L. R. Holmes, Texas Company; J. H. Jenkins, Associated Oil Company; A. T. Jergins, A. T. Jergins Trust; Lester H. Keim, Oil Well Supply Company; M. E. Lombardi, Standard Oil Company; P. M. Longan, Milham Exploration Company; A. B. Macbeth, Southern California Gas Company.

A. A. McDonald, Hughes Tool Company; George H. Machris, Wilshire Oil Company; Theodore Martin, attorney; A. C. Mattei, Honolulu Consolidated Oil Company; William C. McDuffie, Pacific Western Oil Company; E. J. Miley, Miley Oil Company; J. R. Pemberton, Petroleum Securities Company; W. B. Pyron, Western Gulf Oil Company; F. C. Ripley, Chanslor-Canfield Midway Oil Company; A. L. Weil, attorney.

CONVERSION ADDS 60,000,000 C.F. LOAD TO DENVER SYSTEM

A conversion job of unusual size was completed recently in Denver, Colorado, by the Public Service Company of Colorado under the supervision of C. W. Gale, with the installation of gas at the National Jewish Hospital in that city. Between 60 and 70 million cubic feet of gas will be used annually by the hospital.



UPPER: Gasoline motor-driven rig used on Amarillo-Denver line to apply bitumastic enamel. Primed pipe is being rolled into place before enamel is applied. LOWER. Applying enamel to a 60-foot length of 20-inch pipe on the Arkansas Natural Gas Company line from Monroe to Shreveport, La.

Rolling Rig Method *of* Pipe Covering

By H. M. Cook

Wailes Dove-Hermiston Corporation

A PROCESS for applying bituminous coatings which has been in wide application on larger size pipe lines is that known as the rolling rig or turning rig method, used especially on sizes 16-inch and larger. Introduced by the Wailes Dove-Hermiston Corporation, this process is designed to produce even coating and to avoid waste of materials. It consists essentially of revolving lengths of pipe by means of special apparatus, while the molten covering material is poured on top and spread over the surface by canvas pad.

Several methods have been developed for applying bituminous coatings to pipe. For many years the only way known of applying bituminous coatings in the field was by brushing them on. It is probably the simplest method known, but at the same time it is the slowest and most costly. Unless the greatest care was taken when brushing a sharply curved surface such as that presented by pipe of small diameter, say up to 12-inch diameter, patches were sure to be missed, especially on the under surfaces.

At best the coating was apt to be unevenly applied, and a great deal of material was wasted by dropping from the brush as well as by the constant unavoidable application of needless thickness where brush strokes overlapped.

A big step in this reduction of the cost of applying the protective coatings was made with the introduction of what is generally known as the canvas sling or "rag" method of coating. This method originated in the West, and is now so well known that it needs little description. The molten enamel is poured along the top of the pipe after it has been cleaned and primed. It flows down over the sides, coating the top half of the pipe. At the same time a canvas sling is manipulated back and forth across the bottom of the pipe, in such a way that it distributes the coating evenly and covers the lower half of the pipe.

The canvas sling method proved much superior to the brushing method in every way. Not only was the coating more even and uniform but the application was made rapidly, easily and with comparatively little waste of material. For the smaller sizes of pipe the canvas sling method is still regarded as the best known way to apply hot bituminous coatings. Some skill is required in using the sling, but with a little instruction from experienced men this difficulty is soon overcome.

For pipe 16 inches in diameter and larger the rolling rig method has recently been developed. In this method, lengths of pipe are revolved while the molten enamel is poured on the top and then spread evenly over the surface by a canvas pad.

Rolling rigs were built and introduced for pipe line work by the Wailes Dove-Hermiston Corporation, which was recently granted a basic patent upon the process. Light turning rigs were first used, which were hand-driven and designed to handle single lengths of pipe.

With flat level country such as prevailed on the Amarillo-Denver line, motor-driven rigs supplemented the ordinary hand-driven rigs to advantage. Hand-turned rigs were used again on the Monroe-Memphis line for 160 miles of bitumastic protected pipe through the flood regions paralleling the Mississippi River.

The use of 40- and 60-foot lengths of pipe on the Monroe-St. Louis line, just completed, necessitated building a heavier type of rig to handle them, although in many cases the light rigs have been used successfully on this line, which is bitumastic protected for more than 325 miles.

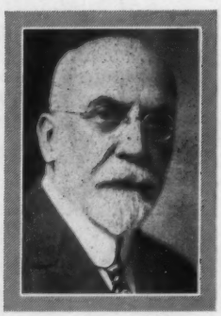
Sixty-, 90-, and even 120-foot lengths of pipe were handled by the rigs on the Arkansas Natural Gas Company's new 137-mile 20-inch line running from the outskirts of Monroe, La., to Shreveport. Two and sometimes three pouring gangs worked on a section, and made fast time on this line, which was bitumastic protected throughout.

On both the St. Louis and Arkansas Natural Gas lines, some of the coating gangs coated as high as a mile of pipe per day.

George G. Ramsdell Called *by* Death, Dec. 27

GEORGE G. RAMSDELL, one of the pioneers of the American gas industry, died at his home in Jackson Heights, New York, at 6:00 A. M., Friday, December 27, 1929, after a brief illness with pneumonia. He was 81 years of age.

Mr. Ramsdell was born in Providence, R. I., April 30, 1848. He attended Vincennes University, completing his course in 1863. He undertook to organize a company to heat Vincennes from a central plant. Officials of the Citizens Gas Company became interested in the project, resulting in his appointment as manager and treasurer of that company in 1877. He held this position until 1890 when he became general manager of the American Gas Company, Philadelphia, Pa. In 1905 he became president of the Ramsdell Inverted Gas Lamp Company.



George G. Ramsdell

Mr. Ramsdell was elected secretary of the Society of Gas Lighting in 1904, celebrating the 25th anniversary of his incumbency in this capacity last October when a group of leaders of the industry tended him a testimonial dinner.

He was one of the first directors of the American Gas Institute, organized in 1906, and was elected secretary of the Institute in 1911, being the third and last secretary of this organization and serving until its amalgamation with the American Gas Association.

He served as president of the Western Gas Association in 1889; president of the American Gas Light Association in 1899. He was an honorary member of the Ohio and French Associations, and in 1900 attended the International Gas Congress at Paris.

At the time of his death, Mr. Ramsdell was the senior member of the Headquarters Staff of the American Gas Association, New York City, with which organization he had been identified since its formation. He had served the Association faithfully as Librarian, Director of the Employment Bureau and Editor of the Bulletin of Abstracts and the Rate List.

THREE NEW COMPANIES FORMED IN MONTANA DISTRICT

New companies organized recently for gas and oil development in Montana include the Montana Utilities Gas Company, with A. H. Perkins of Havre, and Louis Sachs and W. J. Allison, both of Minneapolis, Minnesota, as directors for the coming year; the Montana Utilities Service Company, of which C. I. Tenney, A. E. Drake and C. E. Tenney, all of Minneapolis are directors, and the Montana Utilities Pipe Line Company, with F. T. Merrill of Havre, R. P. Jones of Shelby, and D. C. Tenney of Minneapolis as directors.

EAST TEXAS TOWNS HAVE GAS FROM MONROE FIELD

The following East Texas towns are among those to receive natural gas from the line recently completed by the Arkansas Natural Gas Corporation from the Monroe and Richland gas fields to Waskom: Jefferson, Linden, Pittsburgh, Gilmer, Hughes Springs, Omaha, Daingerfield, Winnsboro, Naples, Mount Vernon, Mount Pleasant and Avinger. Gas is already being supplied a number of these towns by the Southern Cities Distributing Company, the retail distributing unit of the Arkansas Natural.

SO. CITIES DISTRIBUTING CO. HAS OFFICES IN PITTSBURGH, TEX.

Pittsburgh, Texas, offices for the Southern Cities Distributing Company, have been established in the Maddox Building, of that city. Gas was turned into Pittsburgh mains by the distributing company during the first week of December, a few days after it was turned on at Mt. Pleasant, Texas. A. B. Lawrence is in charge of the company's offices at Mt. Pleasant. Gas was turned on at Gilmer, Texas, by the company on December 10.

STAND-BY PIPE LINE BUILT ON LEA CO. LINE

Construction of a stand-by service line over Salt flat and Guadalupe range on the natural gas transmission line from Lea County to El Paso has been completed, according to an announcement by H. G. Frost, vice-president and general manager of the El Paso Natural Gas Company. The line will be maintained and held in readiness in case of emergency.

JANUARY 22 SET FOR HEARING ON SAN DIEGO NATURAL GAS

The California Railroad Commission hearing set for December 11, called in connection with San Diego Consolidated Gas and Electric Company's plans for introducing natural gas service, has been reset for January 22 at San Diego. Contemplated gas purchase contracts, service rates, etc., will be reviewed.

CITIES SERVICE GAS COMPANY BUILDS BRIDGE AT PETROLIA

The Cities Service Gas Company recently built a 673-foot bridge over the Neosho River between the pumping station and the auxiliary building at Petrolia, Kansas. The bridge spans the river at an average height of 12 feet, and is constructed of 4-inch pipe imbedded in concrete piers.

JOHN FARNER SUPT. OF NEW KETTLEMAN DIVISION

John Farner, formerly superintendent of distribution for the Midway Division of the Southern California Gas Company is now superintendent of the newly organized Kettleman Division of the company.

Welding the United Gas Company line from Texas fields to Monterrey, Mexico

Texas Gas Crosses *the* Border

(*Continued from Page 29*)

field, in Zapata county, Texas, was acclaimed. Within 48 hours industries were commencing to be fueled with natural gas piped across the Rio Grande and on to Monterrey by a line belonging to the United Gas Company system.

This gas line is 143.34 miles long. From the Jennings field to Roma, Texas, where the line crosses the Rio Grande, the distance is 47.34 miles; and from Roma to Monterrey the distance is 96 miles. To operate the line in Mexico, the United Gas Company has organized under Mexican law, Compania Mexicana de Gas, S. A., which subsidiary will wholesale gas to the public service company at Monterrey for domestic distribution, contracting many of the major industries in that city and vicinity direct. Contracts already entered into or being negotiated when the flare proclaimed the arrival of the gas aggregated some 20,000,000 cubic feet per day.

United Gas Company's Monterrey line was laid in what is reckoned record time. The contract was let to Smith Brothers, Incorporated, and pipe was ordered. This was late in June. Actual construction commenced late July-early August. The line is a welded one throughout, laid with 12-inch pipe. Its capacity under existing well head pressures in the Jennings field, where United Gas Company through its operating subsidiaries has extensive production, and acreage yet undrilled, is reckoned at 21,000,000 cubic feet per day. With a single compression station added company engineers eestimate the capacity can be stepped up to 20,000,000 cubic feet daily.

Now as to Monterrey itself:

Monterrey presents the admirable picture of being not only an industrial and rail center of worth, but at the same time a city of homes. With an elevation of 1,624 feet above sea level, the valley in which it is located is almost entirely surrounded by mountains, especially on the north and west. In fact, directly north of the city is the famous "Saddle Mountain" ("Monte de la Silla"), which is crowned with what appears to be a saddle of Brobdingnagian proportions. The city's elevation insures a delightful climate throughout the year.

Next to the capital of the republic, Monterrey is the greatest railroad center in Mexico. It is easily the key to rail transportation for all northern Mexico, as it is connected with all the lines of the National Lines of Railways. It is in direct rail communication with the City of Mexico, and the important intermediate cities, and so on south to the republic of Guatemala. To the north, its rail connections place it in easy reach of Laredo, Brownsville, Eagle Pass and El Paso. To the southeast a direct line runs to Tampico and water communication with the world; to the west the rail lines reach quickly to Torreon and Durango.

Some idea of distances may be gathered from the following: Monterrey is 158 miles (by rail) to Laredo; it is 205 miles from Brownsville; 170 miles from Torreon; 325 miles from Tampico and tidewater; 640 miles from Mexico City.

With an ample supply of blast furnace coke and iron ore in reasonable proximity to its borders, it was natural that Monterrey should attract blast furnaces and smelters, from which it has gained the name of "Pittsburgh of Mexico." The plants there of the Cia. Minera de Penoles (American Metal Company), the American Smelting and Refining Company and the Monterrey Iron and Steel Smelter are well worth seeing. The latter is said to be the largest plant of its kind in Latin America.

Apart from its smelters, Monterrey has possibly the largest brewery in the western world in the Cerveceria de Cuahtemoc, which not only enjoys a large domestic trade but exports much of its product as well. Other manufactories include a large glass works, a modern Portland cement factory, cotton mills, and factories where nails, shoes, tinware, crackers and other foodstuffs, bottled products such as mineral water and soft drink beverages, candy, furniture, mattresses, soap, perfumes, cardboard, candles, medicinal and chemical products, oils and lard, matches, tiles, butter, chewing gum, brick, vehicles, starch, fibre articles, et cetera, are manufactured. The city's plazas are veritable botanical gardens; its hotels are commodious and well managed, and its people are noted throughout the republic for their genial hospitality. The automobile road from Laredo to Monterrey is one of the best in the republic.

So, it is a far cry from the days when a conquistador of old Spain stared at that peaceful valley, to the modern, bustling city of Monterrey looking on with expectant smile as a gas flare proclaims the arrival of Texas gas.

General Employee Sales *in* Portland

(*Continued from Page 28*)

total of all teams down to 97 per cent of high bogies set at the start of the campaign. Thus, by the terms laid down at the outset of the contest, $582 in prize money was distributed on the basis of the total sales.

It is quite likely that if a similar campaign is staged again, the quotas will be set somewhat differently. To be fair and equitable they must be based on the reasonable opportunity that the various departments have of coming in contact with the possible purchasers.

During the present year it is estimated that $100,000 will result in sales directly or indirectly traceable to employee cooperation. Entirely aside from the sales made there is another great value in the activity, namely, that it has taught hundreds of gas company employees that they can sell, many of them never having made the effort before. It has made them better representatives of their company from a public relations standpoint, for they now move about, each in his own sphere of influence, more fully armed with facts with which to answer any possible objections they may hear to gas as a fuel or to modern gas burning appliances.

Results *of* First Food Preservation Drive

CONCLUDING the first National educational drive in the interests of food preservation by proper refrigeration, the National Food Preservation Council in December announced the names of the 835 prize winners of the essay contest which closed the last day of September, which was set aside as Food Preservation Month.

The National Food Preservation Council was headed by Matthew Sloan of New York in this effort and was supported by the following organizations:

The American Gas Association, Bureau of Home Economics, U. S. Department of Agriculture, General Federation of Women's Clubs, American Institute of Refrigeration, National Retail Furniture Association, American Bottlers of Carbonated Beverages, Society for Electrical Development, Association of Edison Illuminating Companies, National Refrigeration Manufacturers Association, Refrigeration Division, National Electrical Manufacturers Association, Refrigeration Machinery Association, National Electric Light Association.

In more than 2,000 cities and towns of the United States, representatives of these organizations worked together under the leadership of local councils, through meetings, newspaper, trade journal and outdoor advertising to present to the public the advantages of the proper preservation of food. Through the National Council, large advertising space was carried in the September issues of seven leading national magazines.

Probably the greatest public interest was aroused by the Essay Contest with $25,000 in prizes offered.

The first prize of $10,000, with an alternative choice of a model home, was won by Dudley L. Harley, Martinsburg, West Virginia, a senior student in Lehigh University and a candidate for a Rhodes Scholarship.

Winners of other principal prizes were: Second prize, $3,500—Miss Grace Hampson, Edgewood, Rhode Island; third prize, $2,00—Miss Grace Morris Price, Pittsburgh, Pa.; fourth prize, $1,000—The Rev. Warren C. Taylor, pastor of the First Baptist Church, Albion, N. Y.

Many individual gas companies cooperated in the 1929 program and will next year again tie in with the National Council, which has announced plans for another intensive drive for food preservation through refrigeration.

WINNIPEG ELECT. CO. COMPLETES NEW GAS PLANT

Winnipeg Electric Company of Winnipeg, Manitoba, announces the completion of a new $100,000 gas plant which will increase the company's daily gas production to 6,500,000 cubic feet.

During the first eight months of 1929 the gas send-out of the company was 23.8 per cent higher than during the corresponding period of 1928.

STANDARD OIL "FLAMO" IS NOW ON PRODUCTION

The Standard Oil Company of California now has on production the company's liquefied gas, "Flamo," which will be transported in steel cylinders and sold to suburban and rural homes which are not in gas serviced districts.

The company has been investigating the market for a liquefied gas in the states of California, Arizona and Nevada.

R. R. Brandenthaler *and* Associate Killed

R. R. BRANDENTHALER, senior petroleum engineer of the Bureau of Mines division at Bartlesville, Oklahoma, and Meredith A. Miles, assistant petroleum engineer, were killed on December 13 by an explosion at the Bartlesville station of the Bureau, which occurred in an experimental oil production rig, on which Mr. Brandenthaler and associates had been engaged in work for some months.

The explosion is thought to have resulted from the ignition of gas which had collected within the corrugated enclosure around the derrick. It is not known what caused the gas to be ignited. Mr. Brandenthaler, it is believed, was killed almost instantly, and Mr. Miles died six hours later from burns which he received. Gustave Wade, dynamometer engineer, and Robert E. Holt, steam-fitter, also suffered injuries in the explosion.

A series of experiments, including studies in natural gas flow, gas-lift, prepressuring, and a number of production problems, were in the process of being started by Mr. Brandenthaler and his associates at the time that the accident occurred.

Mr. Brandenthaler was among the best known gas and petroleum engineers in the United States. He entered the service of the United States Bureau of Mines on July 13, 1925, following a number of years of engineering and geological work in the United States, Canada and Alaska. Prior to his work with the Bureau of Mines he was resident geologist for the Union Oil Company of California, and later geologist for the Midway Gas Company of California.

Mr. Brandenthaler was born in Milwaukee, Wisconsin, on April 28, 1890. He received his high school education at Seattle, Washington, where his family moved, and later was graduated from the University of Washington, at Seattle, receiving the degree of bachelor of science in mining and geology.

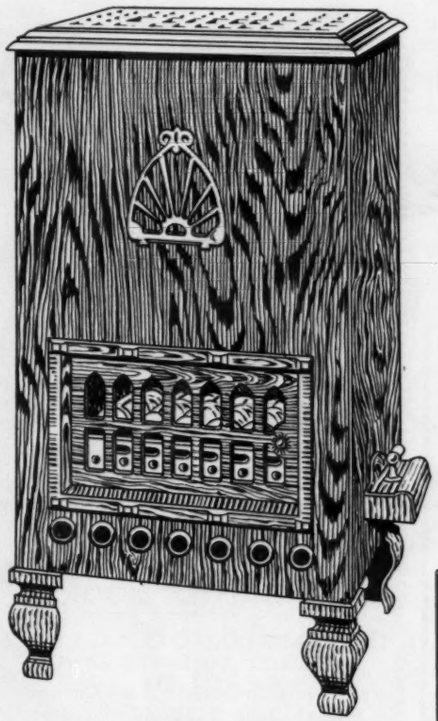
Mr. Miles joined the Bartlesville station of the Bureau of Mines on February 4, 1929, following work with the Marland Refining Company in Ponca City, Oklahoma, the Empire Refineries, Inc., and the Oklahoma Gas & Electric Company. He is a graduate of the University of Oklahoma with a degree of bachelor of science in petroleum engineering.

In the passing of these two men the industry sustains a great loss. Mr. Brandenthaler was held in the highest esteem by all his associates, not only because of his fine professional standards but because of his splendid qualities as a man, and Mr. Miles, though a beginner with the Bureau, had earned the warm regard of his fellow workmen.

BOX FOR AFTER-HOUR PAYMENTS AT FORT WORTH GAS CO.

A convenience for customers in paying bills has been inaugurated by the Fort Worth Gas Company at Fort Worth, Texas, in the form of a box to receive payments after closing hours. The box has been placed in the elevator lobby of the gas company building. Envelopes with printed instructions are available at the box, in which remittances in the form of money or checks may be placed.

NOW You Can Sell a Spark Heater



No. 604—Full Porcelain Enamel Grained Walnut Finish

Height 38¾ inches. Width 20¼ inches. Depth 16½ inches. Shipping weight, 193 pounds. Capable of heating 7400 cu. feet.

Gas Consumption

Rated input—35,000 B. T. U.'s per hour (equal to 35 cu. ft. per hour of 1000 B. T. U.'s natural gas, or 64 cu. feet per hour 550 B. T. U. manufactured gas.

The new SPARK gas circulating heater is designed and constructed along unique yet scientific lines. It is a proven success. Salesmen who are able to offer this beautiful and easy-to-tell-about heating appliance are rapidly building "neighborhood" business.

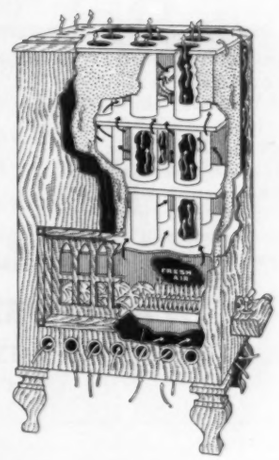
Cheerfulness and comfort are always worth selling. The SPARK circulating gas heater will bring warmth during the chilly months pleasantly and economically. It will live up to the SPARK reputation.

Special Points

Inner chamber airtight-vitreous enamel on heavy gauge steel—**no** fumes or odors can enter the room. Air drawn in at the **bottom** both front and rear, insures extremely rapid circulation. Enameled water pan takes care of moisture content. Outer walls remain comparatively cool.

Approved by American Gas Association. Highest standard of efficiency, durability and economy.

Patents Applied For



Light arrows signify fresh heated air. Dark arrows show heat circulation.

THE HAMMER-BRAY COMPANY

Oakland, California

WARD-WARMED HOMES MAKE WARM FRIENDS, BUILD REAL LOADS FOR GAS

Ward-warmed homes make real friends for Gas . . . not just for heating but for every household use.

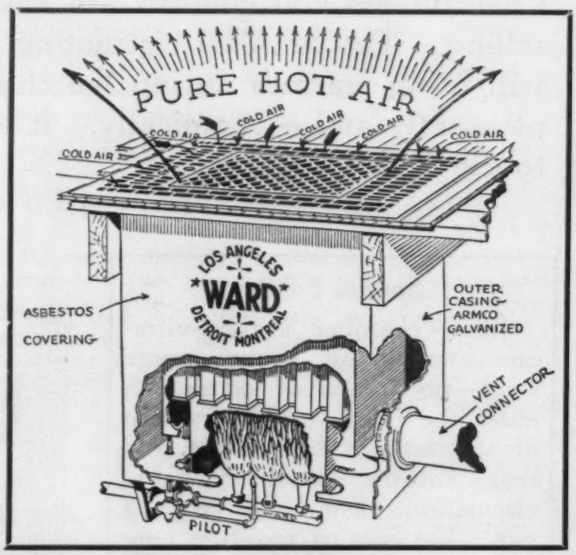
Ward-warmed homes are real load-builders. 50% of the 250,000 Wards now in use are in zero climates, and in Ward-warmed homes gas is the only heating fuel needed.

EASY TO SELL.—The Ward Gas Floor Furnace is easy to sell. The cost is moderate; its operating economy is unusually low. The convenience and comfort of Ward Gas Heat are an argument that appeals to every home.

EASY TO INSTALL AND SERVICE.—One man, in four hours, will completely install the Ward Floor Furnace. So little servicing is required that a single service man adequately services 50,000 Wards in Los Angeles County.

A.G.A. AND OWNER APPROVED.— The Ward Gas Floor Furnace is approved both by the A.G.A. Laboratories and by the owners of 250,000 Wards which have been use-tested under every conceivable condition of climate and gas supply.

EVERY HOME, OLD OR NEW, A GAS HEATING PROSPECT. — No basement, no special preparation of any kind is required for a Ward. It vents to any perpendicular flue. It can be used in any type of home, old or new. Let us send literature showing how 250,000 Wards have been sold . . . how easy, and how worth while for you and your customers it will be for you to sell Wards.



WARD HEATER COMPANY

1243 South Hope Street
Los Angeles, California

ARKANSAS POWER & LIGHT GETS BATESVILLE FRANCHISE

The city council at Batesville, Arkansas, has granted a gas franchise to the Arkansas Power & Light Company, which has headquarters in Pine Bluff, Arkansas. The company has also recently been granted franchises at Newport, Walnut Ridge, Hoxie, Tuckerman, Kensett, Bald Knob, Jonesboro and Searcy, all of which are to be supplied gas from laterals connecting with the Louisiana to St. Louis gas line. Batesville will receive its gas through an extension from Newport.

Laterals have already been completed from the St. Louis line through which the Arkansas Power & Light will serve McGehee, Dermott, Lake Village, Eudora and Wilmot.

CITIES SERVICE CO. TO SPEND $60,000,000 FOR GAS IN 1930

Cities Service Company will spend about $150.000,000 during 1930, $60,000,000 of which will be in connection with natural gas developments, according to a statement made public the middle of December by W. Alton Jones, vice-president of the company.

CANTON, KANSAS, GRANTS NATURAL GAS FRANCHISE

Kansas Pipe Line and Gas Company has been granted a gas franchise in Canton, Kansas, according to press report. The company plans, it was stated, to supply gas to Canton, Gypsum, Inman and Moundridge and other towns in the district from a line being constructed by the company from McPherson.

IDAHO PUBLIC UTILITIES BOARD EXAMINES FRANCHISE PETITION

The Ohio Oil Company and affiliated interests, through L. B. Denning and John McFadyen, has applied to the Idaho Public Utilities Commission for a certificate of convenience and necessity to exercise franchise rights in bringing natural gas to Pocatello and surrounding towns. This step is necessary, under an Idaho law, before securing franchises in the various cities and towns. A hearing was held before the State Commission on December 27 and 28 to examine the company's petition for the certificate.

The proposed line from Ogden to Pocatello would be 200 miles long, and gas would be served from the Baxter Basin field in Wyoming, through the Salt Lake City line. Pocatello is now being served with manufactured gas by the Public Utilities Consolidated Corporation.

SOUTHWESTERN GAS AND ELEC. CO. ANNOUNCES 1930 PROGRAM

A. Lieberman, president of the Southwestern Gas and Electric Company, with headquarters at Shreveport, Louisiana, has announced a contemplated expenditure by his company during 1930 of more than $4,000,000 in new construction. This fund will be used in improving the company's service in the 140 towns which it serves in Louisiana, Texas, Arkansas and Mississippi.

Among the items included in the construction program are office buildings, gas distribution systems, street railway and ice plant improvements, and the construction and improvement of steam generating stations. Real estate purchases amounting to $650,000 were also included.

COMMERCIAL GAS CO., LTD., ASKS PERMIT TO SERVE LANCASTER

The Commercial Gas Company, Ltd., through John F. Beals and James Langston, both of Los Angeles, has applied to the California Railroad Commission for permission to serve gas in the town of Lancaster in Los Angeles County. The company has also applied for permission to issue and sell $75,000 in common capital stock with par value at $10.00 per share, for the purpose of financing the project.

NEW QUARTERS IN PERRYTON FOR PUBLIC SERVICE CORP.

The Perryton, Texas, offices of the Public Service Corporation have recently established permanent quarters in the Stump Building of that city. H. J. Boisdorf is district manager for the company at Perryton, with Tony Lundgren as local manager and Mrs. Horace Lackey as office manager. The Public Service Corporation, with headquarters in Fort Worth, serves a number of towns in the North Plains area. The Perryton office is the district office of the company for the north Panhandle.

PUBLIC SERVICE CO. OF COLO. GETS PERMIT IN FOUR TOWNS

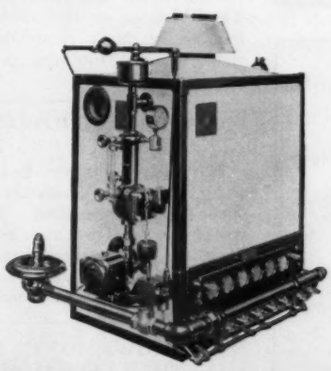
The Colorado Public Utilities Commission late in November authorized the Public Service Company of Colorado to exercise franchise rights in the towns of Arvada, Berthoud, Mountain View, and Edgewater, Colorado. Gas for the towns will be supplied from the Amarillo-Denver transmission line.

announcing·

the greatest advertising campaign ever run for IDEAL GAS BOILERS

look for the double-page ads in these February magazines

Literary Digest
Better Homes & Gardens
Time
American Home
Country Life
House & Garden
Sportsman



recognizing the tremendous demand for automatic heating the American Radiator Company has decided to tell the story of Ideal Gas Boilers to millions of readers of the national magazines throughout 1930... for example, in February over 12,000,000 people will read this story . . . these advertisements from the world's largest manufacturer of heating equipment will, of course, interest thousands of owners and make it easier to sell Ideal Gas Boilers.

AMERICAN RADIATOR COMPANY

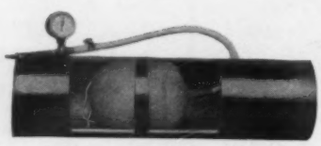
distributed by

AMERICAN GAS PRODUCTS CORP.
Chrysler Bldg., N. Y.

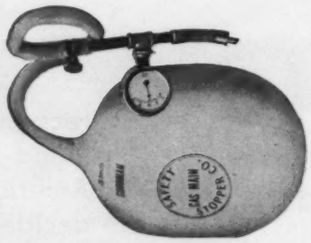
Pipe Stoppers

2" TO 48"

DEPENDABLE TYPE-C BAGS



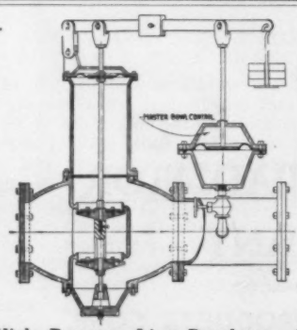
For Any Pipe—
Intermediate Pressures



DEPENDABLE GAS MAIN BAGS—THREE TYPES

Type A—Seamless, reinforced tube.
Type B—Reinforced seams, for heavy duty.
Type C—Canvas-covered, for use where plain rubber will not last. TREATED FOR USE IN OIL LINES while welding is being done.

Safety Gas Main Stopper Company
523 Atlantic Avenue, Brooklyn, N. Y.
Cable Address: Gastopper, N. Y.
Pacific Coast Representative: C. B. Babcock Co., San Francisco, California



High Pressure Line Regulators for reducing pressure from pounds to pounds.

GROBLE REGULATORS & GOVERNORS

Groble Features—

Large Hand Holes
Balanced Valves
Two Piece Valve Stem
Master Bowl Control

Made in sizes from 2 inch to 10 inch.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

LONE STAR COMPLETES PETROLIA FORT WORTH GAS LINE

The Lone Star Gas Company of Dallas, brought to completion on December 20 its 98-mile, 20-inch gas line which extends from Petrolia, Texas, to a point 8 miles east of Fort Worth. At this junction point the line connects with the Lone Star system serving Fort Worth and Dallas. Between 500 and 800 men have been at work on the project since August 1.

The completion of this line brings into use the third line operated by the company between Petrolia and Fort Worth, the former place being a connection point for gas lines of the company which originate in Oklahoma, and in the Panhandle of Texas. One of these lines is 16 inches in diameter and is owned by the company, while the other, a 10-inch line is leased from the government.

MONTANA-DAKOTA POWER CO. TO SPEND $4,500,000

According to an announcement by R. M. Heskett, vice-president of the Montana-Dakota Power Company, about $4,500,000 will be spend in new construction and extensions of natural gas pipe lines and other services during 1930. Included in this amount is the projected natural gas line from the company's gas fields in eastern Montana through cities in Montana and North Dakota, to Williston, North Dakota. Another line will also be constructed to serve cities and towns in North Dakota, the terminus of the second line being Bismarck.

PROVO, UTAH, GRANTS FRANCHISE TO UTAH GAS & COKE CO.

Provo, Utah, has granted to the Utah Gas & Coke Company a 50-year franchise for the service of natural gas in that city. Gas will be brought a distance of 45 miles from the Wyoming-Salt Lake City line, the new line to be of 12¾-inch pipe.

L. Fitzpatrick, vice-president of the Utah Gas & Coke Company states that the company plans to serve towns in Utah county between Sandy and Provo, including American Fork, Pleasant Grove and Lehi.

According to reports the company is negotiating for the purchase of the Utah Valley Gas Company, a Foshay subsidiary, with headquarters at Provo.

FRANCHISE ELECTION TO BE HELD AT SIDNEY, MONT., JAN. 2

Sidney, Montana, has set January 2 as the date for an election to decide on giving the Montana-Dakota Power Company a franchise for the serivice of natural gas. The town is on the route of a main pipe line to be built from the Baker-Glendive structure in Montana, to Williston, North Dakota.

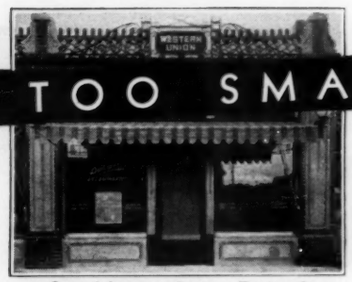
NORTHERN COLORADO COMPANY ASKS TO SERVE LONGMONT

Northern Colorado Public Utilities Company, with headquarters in Fort Collins, through its president, John Handy, has asked for a franchise to serve Longmont, Colorado, with natural gas. The company would purchase gas from the Colorado-Wyoming Pipe Line Company.

GLASGOW, MONT., NOW ON LIST OF NATURAL GAS USERS

Natural gas service was brought to Glasgow, Montana, on December 3, from the wells of the Perkins-Jones Company in the Bowdoin structure.

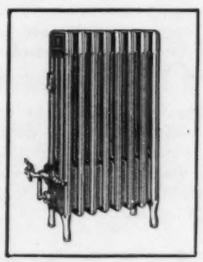
NO JOB TOO SMALL . . .



One of the many Gasteam Equipped Western Union Offices

NO JOB TOO LARGE . . .

South Water Market, Chicago, Illinois—Gasteam Equipped



Clow Gasteam Radiators are perfectly adapted for any size and any type of job. Whether it is a small office, using one radiator, or the huge South Water Market, with more than a thousand radiators installed, Clow Gasteam heats with equally high efficiency.

Private homes and public buildings, railroad stations and beauty parlors, offices and stores—no matter what the size, the type or the location of the job, Clow Gasteam Radiators give clean steam heat—with economy, speed, and freedom from boiler worries.

Each Clow Gasteam Radiator is a complete, independent, steam-heating unit, using gas for fuel. No central boiler or steam piping is necessary. Gasteam unit control permits of operating economy not possible with any central heating system.

Send today for our free book giving a simplified B. T. U. method of calculating steam radiation.

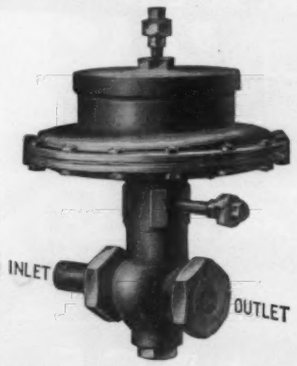
JAMES B. CLOW & SONS 201-299 North Talman Avenue, Chicago

CLOW GASTEAM

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS — AMERICAN GAS ASSOCIATION — APPROVED

A. G. A. Approved.
Listed and Inspected by Underwriters' Laboratories

STOCKED IN EVERY SECTION OF THE COUNTRY



Fulton Dead Weight Governor

An unusually sensitive, frictionless and long-lasting governor to be used either as a direct governor, or for individual service. Maintains a uniform pressure throughout the entire range of flow.

WRITE for the Chaplin-Fulton 60-page catalog. It's free and contains data on our many time-tested and proven gas regulators that you will find invaluable in your work.

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 inch to 24 inches; For All Service. 1 oz. up to 2,000 lbs. Pressure to Square Inch.

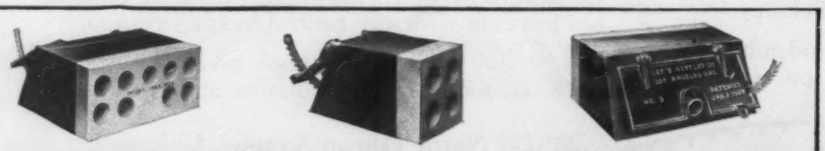
28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Los Angeles — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street Los Angeles

Or Any Jobber



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes
Kinds of gas
Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

ARKANSAS NATURAL HOLDS CO. CONFERENCE AT SHREVEPORT

Members of the various companies of the Arkansas Natural Gas Corporation met December 11 and 12 at the Washington Hotel in Shreveport, Louisiana, for the second semi-annual Distribution Conference of the corpoartion.

Representatives of the Southern Cities Distributing Company, Public Utilities Corporation of Arkansas, Little Rock Gas & Fuel Company and Arkansas Natural Gas Corporation were present at this conference and presented the various methods of coping with the distribution problems faced by their particular companies.

D. W. Harris, vice-president and general manager of the Arkansas Natural, delivered a short address at the luncheon at which approximately 70 persons were present.

Subjects which have a vital bearing on the distribution phases of the gas industry were discussed and the following talks were made: "Peak Load Analysis," H. T. Goss, engineer; "Pressure Surveys," L. F. Babcock, engineer; "Results Leakage Work 1929, Leakage Program, 1930, Southern Cities Distributing Company," F. S. Kelly, superintendent of the Southern Cities Distributing Companies; "Results Leakage Work 1929, Leakage Program 1930, Arkansas Distribution," Carroll Dillard, distribution engineer; "Construction New Distribution Plans," M. E. Larkin, superintendent of the East Texas properties of the Southern Cities Distribution Company; "Proper Handling of Service Calls," Charles Thorpe, distribution superintendent of Little Rock Gas & Fuel Company; "Routine Repair of Domestic Meters," Charles Robbins, general superintendent of Arkansas properties.

CITIES SERVICE COMPANY BOOSTER STATION NEARLY COMPLETED

The compressor station being constructed by the Cities Service Gas Company on the main line from Pampa, Texas, to Kansas City, at a point between Ottawa and Wichita, Kansas is expected to be completed about the first of January. The station, at which are installed four 1,000-horsepower Cooper gas engines and two 190-horsepower Cooper auxiliary engines, will act as a booster station for Ottawa and relieve the Wichita compressor station of part of its load.

K. H. Yinglin has been named as superintendent of the station. Six dwelling houses, a boarding house of eight rooms and a community hall and office make up the buildings at the station which will accommodate the station operators.

OMAHA TO DECIDE ON NATURAL GAS FRANCHISE IN JULY

Members of the Metropolitan Utilities district of Omaha, Nebraska, have agreed to place the proposals for natural gas franchises before the voters at the July, 1930, city election. Five pipe line organizations are reported as being interested in securing natural gas franchises in the city of Omaha, among them the Western Natural Gas Company, headed by T. R. Weymouth.

General T. A. Leisen of the utilities board, will draw up uniform specifications for a new proposed gas contract which will be submitted at the election.

The Utilities Power and Light Corporation, through H. H. Dodd, has also asked for the Omaha franchise.

Time-O-Stat enters 1930 with the finest and most complete line of automatic controls it has ever offered. Many are improved in design, appearance, and usefulness.

Too, Time-O-Stat enters 1930 as a national organization, with Distributors and service organizations in 26 industrial centers of the United States and Canada. All are eauipped to give quick delivery and friendly co-operation to every Dealer and user of automatic controls.

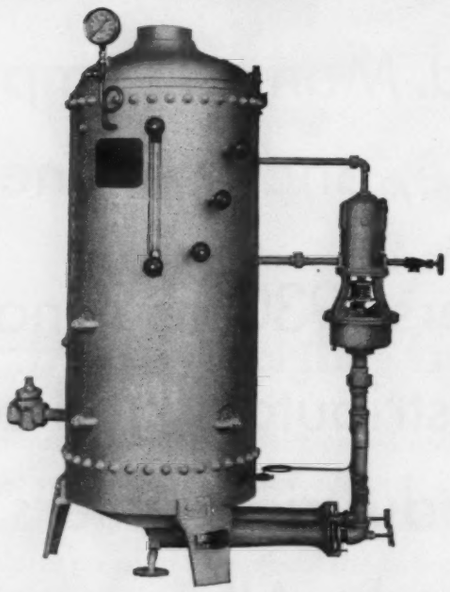
And in 1930, as before, Time-O-Stat's extensive research laboratories welcome the opportunity to work out individual problems of automatic control.

TIME-O-STAT
CONTROLS COMPANY
ELKHART, INDIANA

Manufacturers of AUTOMATIC CONTROLS for Oil Burners · Gas Burners · Coal Burners · Electric Refrigerators · Furnace Fans · Mechanical Stokers · Industrial Ovens · Ice Machines · Unit Heaters · also of Sign Flashers · Mercury Switches · Electric Heaters · Corrugated Metal Bellows

Automatic Gas Fired Boilers

LATTNER



All Sizes from ½ to 30 H. P.

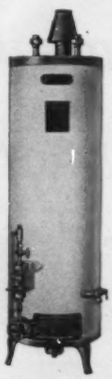
P. M. LATTNER MANUFACTURING CO.

Cedar Rapids, Iowa

A Heater that Will Deliver a Gallon of Hot Water for Every *1 Foot of Natural Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.



New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St. San Francisco

2010 Jackson St. Dallas

242 So. Western Ave. Los Angeles

SANTA MARIA GAS CO. WANTS TO SELL STOCK FOR ADDITIONS

Santa Maria Gas Company, of Santa Maria, California, received permission from the California Railroad Commission to issue and sell $1,199.300 of common capital stock at par to Pacific Lighting Corporation. The money will be used for additions and betterments. Pacific Lighting Corporation is owner of all outstanding capital stock of the Santa Maria company, amounting to $300,700.

NORTHWESTERN NATURAL GAS CO. ASKS TOPPENISH FRANCHISE

The Northwestern Natural Gas Company has asked for permission to serve Toppenish, Washington, with natural gas from the Benton County fields. The line will be an extension of the one serving Sunnyside, Mabton, Grandview, and Prosser, all in Washington.

CONSUMERS GAS COMPANY GETS KLAMATH FALLS FRANCHISE

A 50-year franchise for the service of gas in Klamath Falls, Oregon, has been granted to the Consumers Gas Company. A site for the plant has not yet been chosen, but the company has agreed to start building within six months.

ALBUQUERQUE, N. M., COUNCIL TO GRANT FRANCHISE JAN. 8

A decision on the franchise for the service of natural gas to the city of Albuquerque, New Mexico, is expected to be made at a meeting of the city council on January 8. Several companies are applying for the franchise, and surveys for the various projected lines are being carried on.

P. G. AND E. ASKS PERMIT TO PURCHASE TRACY GAS CO.

Pacific Gas and Electric Company, with headquarters in San Francisco, California, has applied to the State Railroad Commission for permission to purchase 865 shares of the capital stock of the Tracy Gas Company, the purchase price to be $119,550.60.

FORT COLLINS LINE TO BE COMPLETED JAN. 1

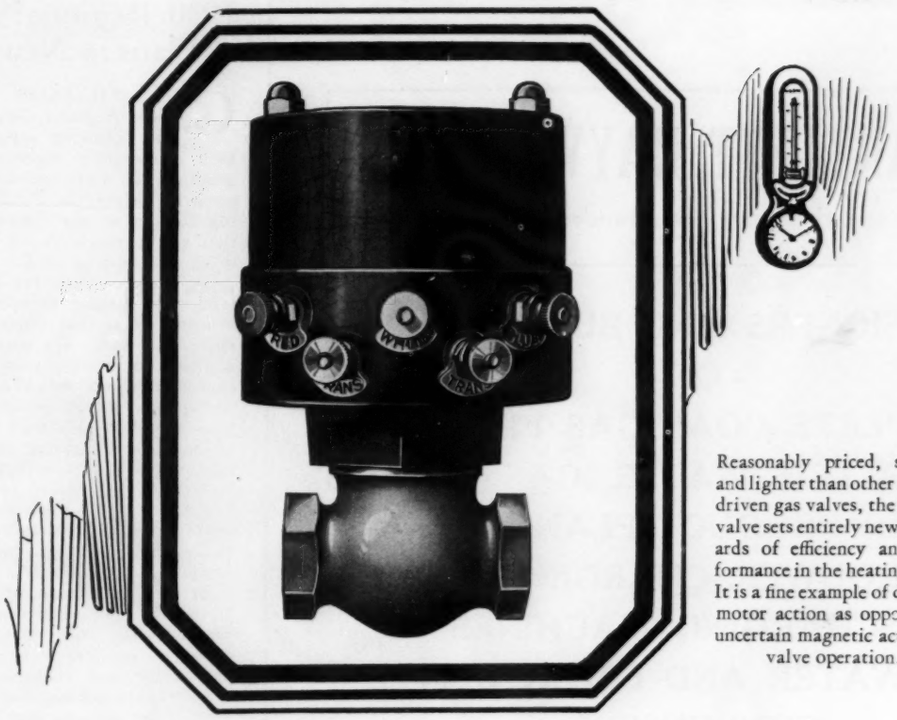
According to a statement made by C. J. Shortess, vice-president and general manager of the Colorado-Wyoming Gas Company, the line from Littleton, Colorado, to Fort Collins was expected to reach the latter city by January 1, 1930.

UTAH GAS & COKE OFFERS PRIZE AT CAKE BAKING CONTEST

A cake-baking contest is being held in Salt Lake City, Utah, sponsored by the Salt Lake Telegram and the Publix theaters. Utah Gas and Coke Company offered a $210 Magic Chef as first prize in the angel food and sponge cake division.

MONTESANO, WASH., ON LIST OF NORTHWESTERN GAS TOWNS

Montesano, Washington, early in December received gas service brought to the city by the Washington Gas and Electric Company of Aberdeen. A modern office and display room has been opened in Montesano, and Charles DeBruler has been placed in charge.



Reasonably priced, smaller and lighter than other motor-driven gas valves, the Teeple valve sets entirely new standards of efficiency and performance in the heating field. It is a fine example of definite motor action as opposed to uncertain magnetic action in valve operation.

A POSITIVE MOTOR-DRIVEN GAS VALVE by TEEPLE

The Teeple electric gas valve is small, compact, and easy to install. Operated with a Teeple thermostat and an ordinary door-bell transformer it gives absolute and automatic control of the heating system. Action is not affected by variations in voltage. Even though the thermostat is in a remote location from the installation, valve action is certain and dependable.

No special transformer is needed—only two watts are required to operate the Teeple valve—thus permitting the use of the ordinary bell-ringing transformer found in every home. A further advantage of the low current is the elimination of the danger of burning sensitive thermostat contacts.

Mechanically, the Teeple electric gas valve is as precise and finely constructed as a high grade watch. Gears and other moving parts are made on special machines. There is no lubrication problem. The result is a valve remarkably free from service trouble and with unusually long life.

Teeple electric gas valves are made in three sizes—½, ¾, and 1 inch. For prices and other information, write the L. R. Teeple Company, 540 East Ninth Street, Portland, Oregon.

TEEPLE

TEEPLE

ELECTRIC GAS VALVE

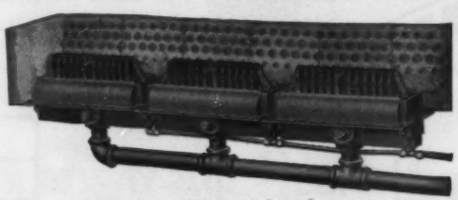
The BARTLETT HAYWARD CO.

BALTIMORE *Engineers and Founders* NEW YORK

DESIGNERS AND BUILDERS
– OF –
COMPLETE COAL GAS PLANTS
CARBURETTED WATER GAS PLANTS
BY-PRODUCT PLANTS
DE BROUWER CHARGING AND
DISCHARGING MACHINES
SALT WATER AND FRESH WATER
CONDENSERS
PURIFIERS
SHAVING SCRUBBERS
CENTRIFUGAL VERTICAL TYPE
SCRUBBERS
STEEL TANKS
VERTICAL WASTE HEAT BOILERS

GAS HOLDERS

R. M. C. Gas Burner



Unexcelled for Conversion Installation
ROTARY MANUFACTURING CO.
5720 Long Beach Avenue Los Angeles, California

1930 Regional Advertising Plans *in* New England

C. D. WILLIAMS, secretary of the New England Gas Association, gives the following suggestion of what the 1930 cooperative regional advertising program of his organization will feature, in his remarks before the Publicity and Advertising Section of the American Gas Association at the recent A. G. A. convention. A brief extract is quoted:

"In our program for 1930 in New England, we propose to spend about $150,000. We will somewhat diminish our newspaper space allotment. We will provide for standardized window display, using light, change, and motion. We will employ in our newspaper advertisements a reply-getting coupon. With this will be tied up a series of booklets describing the general uses of gas service, and specifically, the subjects of water heating, house heating, cooking, refrigeration, etc. We will try to use the motion picture theaters and we will use the radio for about twice the contract we have employed this fall, because it is our judgment that the trend of group thinking is more effectively influenced from a publicity aspect by the vocal message generously sugared by musical entertainment when it is practically and continuously backgrounded by newspaper publicity.

"It (the radio broadcast) is a well-balanced musical program, broadcasting out of Boston over two stations, the most powerful in New Eng'and, avoiding the expense of the chain stations, and while sacrificing a measure of the efficiency of chain coverage, it is apparently stirring up a tremendous amount of good will and interest. Our concerts contain four commercial plugs, briefly dwelling on the history and various uses of gas and suggesting a booklet entitled, 'The Servant of Mankind,' together with a studio photograph of the artists."

P. G. AND E. APPLIES FOR PERMIT TO SERVE BENENCIA

Pacific Gas and Electric Company, with headquarters in San Francisco, California, has applied to the California Railroad Commission for permission to exercise franchise rights in the city of Benencia, California, for the service of gas.

HINSDALE, MONT., GRANTS PERMIT TO MONTANA-DAKOTA

Hinsdale, Mont., on December 13, gave the Montana-Dakota Power Company permission to distribute gas in that town. Work of laying the pipe line was started immediately.

COMMUNITY NATURAL BUYS GAS SYSTEM AT STRAWN, TEX.

The Community Natural Gas Company of Dallas, an affiliated company of the Lone Star, has recently purchased the city gas distribution system at Strawn, Texas, from E. M. Treat and Company.

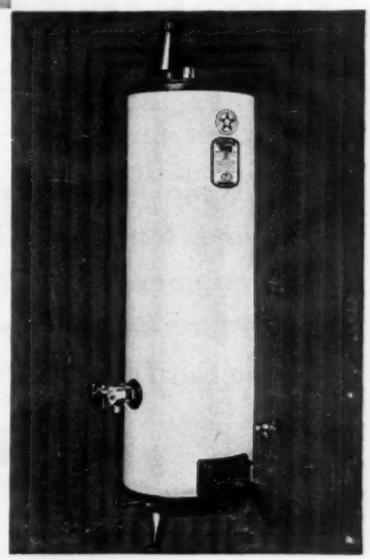
PACIFIC PUBLIC SERVICE CO. NOW IN STANDARD OIL BUILDING

Announcement has been made of the removal on December 1 of the offices of the Pacific Public Service Company from 111 Sutter Street, San Francisco, California, to the Standard Oil Building in that city.

Welsbach
HOTZONE
SELF-ACTION GAS WATER HEATER

Member American Gas Association
Member Pacific Gas Association

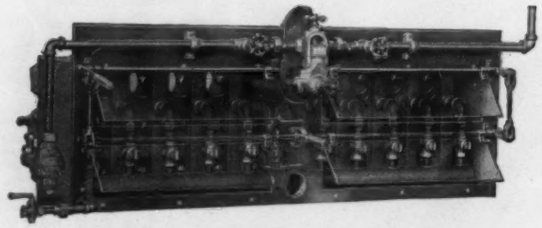
50 Hawthorne Street
SAN FRANCISCO, CALIF.



Beauty **The foundation of all beauty treatments depends on cleanliness, and cleanliness calls for Hot Water. Welsbach advertising and Welsbach window displays have been built up on the beauty appeal. Hotzone Water Heater itself has been improved until it is truly a beautiful piece of household equipment. Altogether, the program has resulted in a banner year for Hotzone sales. We thank our many customers for their 1929 support and promise important announcements shortly which will materially increase sales during 1930. Welsbach Company, Gloucester City, New Jersey.**

The Leahy Multi-Jet Unit

Is an investment that will increase operating efficiency and decrease operating cost



Patents allowed and pending
View showing Combination Gas and Oil Unit

Designed for Front, Rear and Vertical Firing, Burning Efficiently Low or High Pressure Natural or Manufactured Gas

Exclusive features that have created exceptional demand for this unit:

1—Designed with no draft loss.
2—High overloads on low gas pressures with minimum draft.
3—Each individual burner receives correct air and gas mixture for maximum efficiency.
4—Auxiliary air opening around tile increases overload capacity of unit with no sacrifice in efficiency.
5—Correct amount of air for combustion can be obtained with minimum opening in stack damper, which retains heat in boiler instead of letting it escape up the stack.
6—Does not require high gas velocities through burner in order to draw sufficient air for combustion.
7—All primary and auxiliary air is admitted through unit and evenly distributed to each burner.
8—Equal distribution of heat full width of firebox.
9—All parts individual and removable.
10—The oil burner can be inserted in the unit or removed instantly.
11—Equal efficiency on gas or oil.

An Efficient, Indestructible, Portable Unit with a Low Initial and Upkeep Cost

Request literature, data, and installation prints on our

Oil and Gas Burning Equipment

LEAHY MANUFACTURING COMPANY

1804-1810 East 8th Street Los Angeles, Calif. Established 1902

Any movement, whether co-operative or individual, which tends to raise the quality standard of gas equipment, is beneficial alike to the Gas Industry and to users of gas equipment—but most of all to the Gas Industry.

C. B. BABCOCK CO.

San Francisco Los Angeles

E. B. REESER TO HEAD A. P. I. AS PRESIDENT IN 1930

E. B. Reeser, president of the Barnsdall Corporation, of Tulsa, was re-elected president of the American Petroleum Institute at the annual meeting of the Institute held in Chicago early in December.

Other officers elected were: L. P. St. Clair of the Union Oil Company, Los Angeles, vice-president at large; Henry M. Dawes, re-elected vice president of the distribution division; William Irish of the Atlantic Refining Company, Philadelphia, vice-president of the refining division; and William M. Davis of the Phillips Petroleum Company, Bartlesville, Oklahoma, vice-president of the production division.

NATURAL GASOLINE SUPPLY MEN'S ASSOCIATION ELECTS OFFICERS

At a meeting of the Natural Gasoline Supply Men's Association recently held in Tulsa, M. F. Waters, president of Hanlon-Waters Inc., of Tulsa, was elected president; W. A. Schleuter of the Refinery Supply Company, first vice-president; A. J. Kerr, Pittsburgh Equitable Meter Company, second vice-president; M. H. Kotzebue, Tulsa Boiler & Machinery Company, treasurer, and Ray M. Miller, secretary.

R. E. Howe, Atlas Supply Company, W. G. Cummings, Clark Brothers, and J. B. McMahon, the Foxboro Company, were elected as directors of the Association. Mr. Waters succeeds J. H. Satterwhite, of Westcott & Greis, Inc., as president of the Association.

B. V. FISHER NAMED ASS'T. SALES MGR. FOR WESTCOTT VALVE CO.

B. V. Fisher has been appointed assistant sales manager of the Westcott Valve Company, according to announcement of A. V. Wadsworth, executive vice-president of the company, which has headquarters in East St. Louis, Illinois.

Announcement is also made of the appointment of J. L. Hutchings to the Pittsburgh, Pa., territory of the company. J. H. Walker, L. L. Wait and C. L. Wait are in charge respectively of the Houston, Fort Worth and Tulsa district offices for the company.

The Westcott Valve Company has discontinued all of its lines except those sold to the oil and gas trade.

EMPIRE COMPANIES BUY 400 ACRES FOR LANDING FIELD

The Empire Companies have acquired approximately 400 acres of land, lying west of Bartlesville and south of the highway to Pawhuska, for an aviation field. A 60 by 60 feet hangar has already been completed on the tract. The Empire's Boeing biplane is now quartered in the new hangar.

BRISTOL CO. OFFERS CATALOG ON RECORDING GAUGES

The Bristol Company of Waterbury, Connecticut, has just brought from the press a catalog on the company's recording pressure and vacuum gauges. The catalog is style No. 1009, and may be procured by sending a request to the Bristol Company.

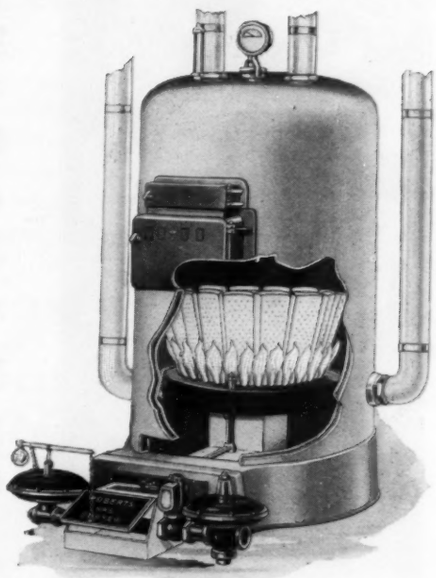
JOPLIN GAS CO. REBUILDS GAS SYSTEM AT REDINGS MILL

The Joplin Gas Company is expending approximately $4,000 in rebuilding the gas distribution system in the Redings Mill resort property of Joplin.

There's a big future for Home Heating by Gas

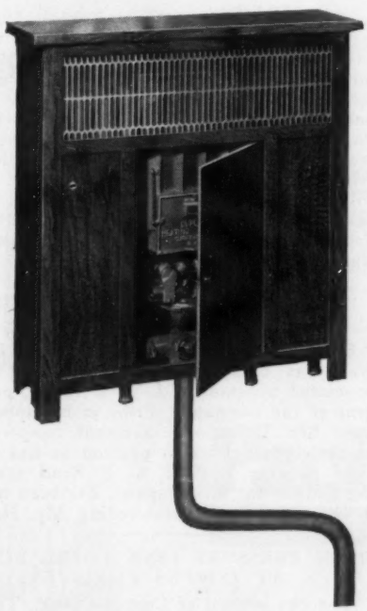
Let Us Help You Get Your Share

THE "Heat by Gas" movement is getting under way rapidly. Sensible people everywhere are turning to this automatic, silent, safe, clean, healthful way of home heating. And this turn to gas heating is building an ever-increasing and profitable gas load for Utilities who make it their job to sell the Roberts and Duplex automatic gas burning equipment.



ROBERTS CONTROLLED GAS HEATING UNIT

DUPLEX UNIT CONTROL GAS HEATING SYSTEM



There's a big future for home heating by gas. In fact, the surface has hardly been scratched. You can serve your customers best where a conversion type burner is required by recommending the Roberts Controlled Gas Heating Unit, and for original installations the Duplex Unit Control Gas Heating unit.

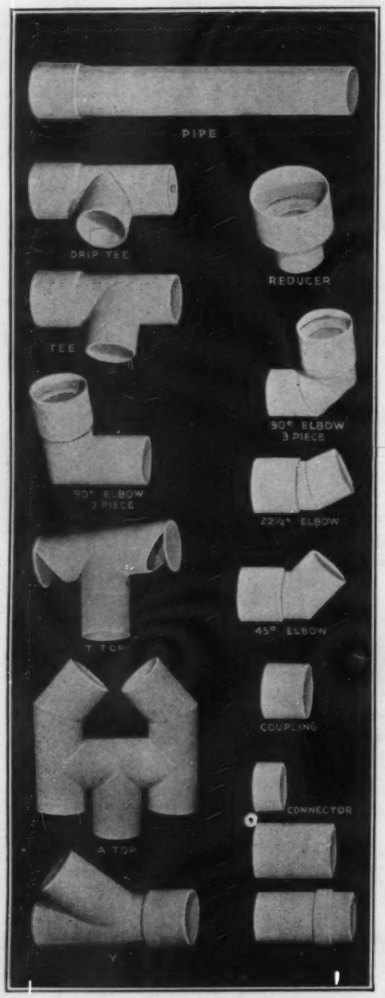
Many well known gas companies have built large profits through the energetic sale of the Roberts and Duplex Units. And at the same time they have increased enormously the consumption of gas in their area. Your company already recognizes the possibilities of home heating by gas. Write today for complete sales data and catalogues on the Roberts and Duplex Units.

ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

CURTISS BUILDING BUFFALO, N. Y.

VITEX



the semi-vitrified non-corrosive gas-vent and flue pipe is made in a variety of sizes and with a complete line of fittings.

Write for further information to the

Plant Rubber & Asbestos Works

537 Brannan Street **San Francisco**

IMUNOL

RAY M. HUDSON RESIGNS POST WITH BUREAU OF STANDARDS

Resignation of Ray M. Hudson, assistant director of the National Bureau of Standards, in charge of Commercial Standardization, to become effective December 31, 1929, was recently announced by the Bureau. Mr. Hudson, on January 2, 1930, will assume new duties as Secretary of the Massachusetts Division of the New England Council, with headquarters in Boston, Massachusetts.

Since his graduation from Syracuse University in 1908, Mr. Hudson has devoted his best efforts to the study of simplification, standardization and scientific management methods, and today is recognized nationally as an authority on the elimination of industrial waste.

MISSOURI NATURAL GETS POPLAR BLUFF FRANCHISE

The Missouri Public Service Commission has granted to the Missouri Natural Gas Company a permit for the construction of a lateral line from the Mississippi River Fuel Corporation's main line to Poplar Bluff, Missouri, a distance of about four miles. The company has already completed the distribution system at Poplar Bluff.

Citizens of Farmington, Missouri, granted the Missouri Natural a franchise for the service of natural gas during the first of December by a vote of 399 to 45. The Missouri Natural Gas Company is said to be a subsidiary of the Utilities Power and Light Corporation, holding company for the Laclede Gas Light Company of St. Louis, organized expressly to serve natural gas to communities adjacent to the Louisiana-St. Louis line.

ALABAMA NATURAL ASKS PERMIT TO SERVE SEVENTEEN TOWNS

Alabama Natural Gas Corporation, a subsidiary of the Southern Natural Gas Corporation, has applied to the Alabama Public Service Commission for permission to extend its mains to Ashville, Calera, Carrollton, Cordova, Gordo, Heflin, Helena, Jasper, Leeds, Lincoln, Montevallo, Parrish, Pelham, Pell City, Ragland, Reform and Siluria. Gas will be served these towns from the 450-mile line being constructed by the Southern Natural Gas Corporation from the Louisiana gas fields.

D. A HULCY NOW ASSISTANT TO PRES. OF LONE STAR GAS CO.

D. A. Hulcy, associated with the Lone Star Gas Company since 1920, has been appointed assistant to L. B. Denning, president of the company. Prior to his appointment Mr. Hulcy was assistant comptroller of the company, which position he has held since January 1, 1928. C. P. Read, traveling auditor for the company, has been made assistant comptroller succeeding Mr. Hulcy.

HIGH PRESSURE LINE TO BE BUILT AT CORPUS CHRISTI

The city council of Corpus Christi, Texas, opened bids, during the first part of December for the construction of an 8-inch, high pressure natural gas line, from the Saxet gas field to the city's gate, a distance of approximately 20,100 feet. Under the contract an old water line put into use as a gas line will be taken up.

$20,000 FOR IMPROVEMENTS AT GRAHAM, TEXAS

The Texas-Louisiana Power Company is reported to be expending between $15,000 and $20,000 in enlarging and improving its mains in the vicinity of Graham, Texas.

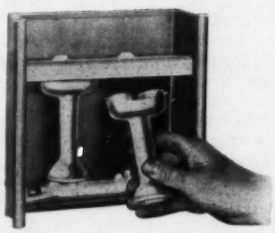
You Should Know About The *Pacific* Line of Radiant Heaters

Here are a few models of the complete line of Radiant Heaters with exclusive and outstanding improvements. These features are built into many beautiful new models, one of which will conform to any predominating type of architecture or decoration. The prices are exceedingly reasonable, considering the high quality in every detail, and the beauty of line and finish.

In every one of these there is built the famous

New Feature *Pacific* Burner

with seven advantages which mean added efficiency and satisfaction to the user, which in turn means more satisfied customers for you. Here are the seven big features of the Pacific Burner:



1. Pacific burners require no adjustment.
2. Pacific burners are instantly removable for cleaning. It is not necessary to use tools to remove bolts or screws. Just lift out the burner!
3. Pacific burners operate efficiently on varying gas pressure without affecting combustion.
4. Pacific burners maintain a maximum high temperature flame, which is necessary for full efficiency.
5. Operation and construction of Pacific Radiant Heaters are so simple, safe and efficient that the need for service adjustments is practically eliminated.
6. Pacific burners are completely machined with special precision-equipment, insuring perfect operation.
7. Installation requires only one simple connection to gas. No further adjustment necessary.

Inquiries are solicited from responsible dealers. Send for descriptive literature and merchandising proposition.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

Roseberry and Walter Streets
Huntington Park California

Gas-Steam Radiators

Round Furnaces

Dual Pipeless Furnaces

Fireplace Radiant Heaters

Recess Radiant Wall Heaters

Automatic Storage Hot Water Heaters

Pipeless Floor Furnaces

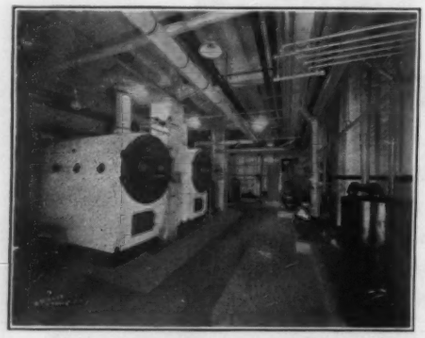
Gas Radiators—Pressed Metal and Cast Iron

Agencies Throughout the West

Call for a Pacific Heating Engineer

MANUFACTURERS *of* EVERY TYPE *of* GAS HEATING APPLIANCE

WEBSTER
RADIANT
GAS BURNERS
in the
HEATING FIELD



Webster Radiant Gas Burners in the Oklahoma Natural Gas Corporation Bldg., Tulsa, Okla.

Office Buildings, Masonic Temples, Schools, Churches, Y. M. C. A.'s, Laundries, Banks, Apartment Houses, Hotels, Industrial Plants—wherever there's heating to be done, you'll find representative Webster Radiant Gas Burner installations to point to with confidence as examples of satisfactory, economical and efficient firing of heating boilers or furnaces.

We'll be glad to send a list of installations to show prospects what the Webster Burner has done in your territory.

Call on us for advice, service and sales aid.

WEBSTER
ENGINEERING
COMPANY
Tulsa, Okla.
DIVISION OF
The Surface Combustion Co. Inc.

Meter-Reading Education *for the* Consumer: A Good-Will Gesture

(Continued from Page 32)

entering the building could not fail to see it.

Simultaneously with these preparations, a 14-page booklet was printed with a three-color cover. This was entitled, "How to Read Your Meter." This booklet contained clear, simple instructions with ample illustrations of gas and electric meter dials for accurate meter reading. The reader was also told that the amount of current or gas consumed must be measured from the last reading of the meter. Following the instructions in actual meter reading came an explanation of how to compute the gas or electric bill. A table showing the *net* bill corresponding to every *monthly* consumption from zero up to 200 k.w.h. was given for computing the electric bill. Owing to the simplicity of the gas rate, no table was given. It is a matter of a moment's calculation to figure the gas bill, once knowing the rate per 1000 cu. ft., and remembering to add 25 cents a month service charge. Thousands of these booklets were printed, and the forms always held in case an extra quantity was needed.

These booklets were placed on display in the meter reading booth on the first floor of the building the day the booth was opened. On this same day the first advertisement announcing this new service appeared in all daily papers. This 1000-line advertisement, captioned "Yours Is Ready Now," pictures the booklet ready for distribution. The public were also told that these booklets would be available by writing or phoning as well as by personal calls.

This new service was hailed with overwhelming enthusiasm on the part of the customers. On the first day approximately 800 persons had their first lesson in meter reading, and the count of pamphlets given out showed close to 750.

At the beginning of the second week of this service another large newspaper advertisement, "He Will Show You," measuring 1260 lines, was run in the daily papers over a period of four days. Crowds still continued to come in daily, enthusiastically receiving instructions from the trained and expert meter reader.

"It's Easy to Read Your Meter," the third advertisement calling attention to the service offered to customers of the New Orleans Public Service, Inc., was run in the daily papers during the third week of the campaign.

As the crowds began to diminish after six steady weeks of very fine response, it was decided to bring the campaign to a close. One more 1000-line advertisement, "Can You Read Your Meter?" appeared in the daily papers. This called attention to the fact that this course of instructions in meter reading would be discontinued at the Public Service building, although the booklets would still be available upon application.

Coincidently with the anticipated close of this campaign, the New Orleans Federation of Women's Clubs staged a "Better Homes Exposition," at which the New Orleans Public Service Inc. contracted for two booths, one for displaying electric and gas appliances, and one for continuing its meter reading course. A booth quite similar to the one erected on the first floor of the building at the outset of the campaign was installed, with the same expert meter reader in attendance. The "How to Read Your Meter" booklets were also available at this booth. The exhibition lasted throughout a week, and a steady stream of interested spectators patronized the Public Service Booth. Once more, several hundred of the booklets were distributed.

The company has felt highly gratified at the enthusiastic response with which this new service was met. Not only did the vast crowds which assembled daily to learn to read their meters serve to justify the company's belief in the project, but most particularly the general attitude of the public to this sane and logical proposition. Casual newspaper readers, in a great many instances men who would not ordinarily concern themselves with the problems of the home and the housekeeper, commented on the appropriateness of the thought behind the campaign. The advertisements themselves aroused wide attention, and even if every housekeeper in the city of New Orleans did not make a special trip downtown to learn to read her meter, she could not help but know that she could have learned to read her meter had she but taken the trouble.

Requests for booklets to be mailed out to customers were received in gratifying numbers. It is a significant fact, too, that not one booklet was given out unsolicited. The meter reader in charge of the special meter reading booth was advised not to force the booklet upon any spectator. They were not distributed promiscuously at any time. If a customer showed in any way that he was interested in learning to read his meter, the booklet was gladly furnished.

In view of the tremendous response to the New Orleans Public Service Inc. meter reading campaign, it is not too much to assume that some part of the misunderstanding that may sometimes exist between a utility company and its customers has been eliminated. Gas and electricity, it is true, are still products that you can not put your hands on, as you would a piece of meat purchased from the butcher, but the amount of gas and electricity you require can be very accurately checked, once the knowledge of meter reading is mastered. Knowing these amounts, the monthly bill can therefore be very readily computed. Armed then with this information, it becomes most improbable for the customer to question the company's charges.

Whether or not this knowledge, once gained, will be put into practice in actually checking the consumption of gas and electricity each month, remains to be seen. That is really not so important after all. What remains of utmost importance, however, is the conviction that this company was sincere in its efforts to acquaint the people of New Orleans with the intricate details of meter reading, and is at all times genuinely interested in furnishing the best possible service to its customers. If this basic misapprehension in regard to gas and electric charges be undermined, and it is an assured fact that this meter reading campaign has gone a long way towards doing just that, then a clearer spirit of cooperation and tolerance is bound to result.

Automatic Heat Control means Minneapolis-Honeywell to the vast majority of your house heating prospects

Forty-five years of intensive selling, forty-five years of national advertising, culminating in the powerful, human, 1929-30 campaign, have earned an unparalleled public acceptance for the products of Minneapolis-Honeywell.

The buying public's faith in Minneapolis-Honeywell automatic heat control is a strategic selling advantage in your favor when you offer house heating equipped with Series 10 and Series 20 controls.

Engineered for maximum efficiency, safety and economy in operation, tested and proved in thousands of house heating installations, Minneapolis-Honeywell Series 10 and Series 20 controls are the inevitable choice of far-sighted gas company executives.

You are invited to write for further information.

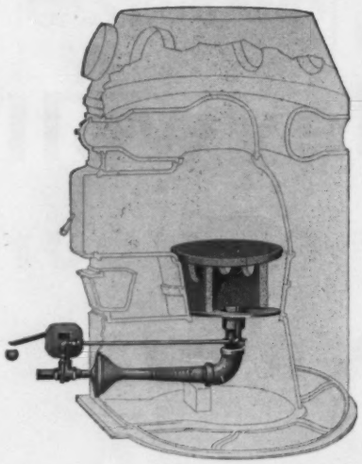
ARTHUR F. ERICKSON COMPANY
Pacific Coast Distributors

557 Market Street, SAN FRANCISCO, CAL.
Selling Building, PORTLAND, OREGON
Terminal Sales Building, SEATTLE, WASH.

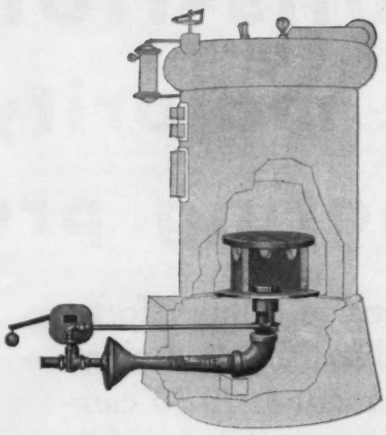
MINNEAPOLIS HEAT REGULATOR HONEYWELL

MAXON

Conversion Gas Burners



The above is an application to a warm air furnace. The burner is easily installed and the unit is fool-proof, making it a very dependable conversion unit for gas companies to recommend and sell.



This is an application to a round boiler. The burner is equipped with a snap-acting valve which can be attached to the existing furnace chain and manually controlled from upstairs. Either automatic or hand-controlled is recommended.

Pacific Coast Representative

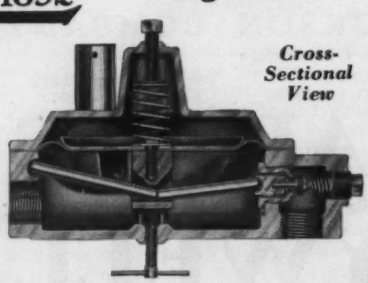
The T. G. ARROWSMITH CO.
661 Howard St.
San Francisco, Calif.

MAXON PREMIX BURNER CO.
INDUSTRIAL FUEL BURNING EQUIPMENT — FOR OIL OR GAS, OR BOTH COMBINED
MUNCIE PREMIX INDIANA

Reynolds Gas Control Since 1892

Reynolds Little Giant Regulator

Products for all kinds of Pressure Reduction—for either artificial or natural gas.
GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.
VALVE—Automatic Quick Closing Anti Vacuum.



Cross-Sectional View

Reynolds Gas Regulator Company
Anderson, Indiana

INDUSTRIAL CLUB OF ST. LOUIS HONORS GAS CO. EXECUTIVES

A DINNER, attended by about 500 business leaders of St. Louis, Missouri, was given by the Industrial Club of that city, on December 5, honoring executives of the Mississippi River Fuel Corporation, which has recently brought to completion a 431-mile natural gas line extending from the Louisiana gas fields to St. Louis and environs.

Christy Payne, of New York, president of the fuel corporation was the principal speaker, and was introduced by Harry Scullin, president of the Scullin Steel Company, the first St. Louis industry to make use of natural gas.

Officers of the fuel corporation present at the dinner included Howell C. Cooper of Pittsburg, vice-president; H. A. Koechling, treasurer; Edwin S. Hall of New York, general counsel, and Ben C. Comfort, manager of the general offices, which are in St. Louis. Other guests, associated in some phase of the pipe line project, were: Harry C. Abell of New York, vice-president of the Electric Bond & Share Company; Carl H. McHenry of Monroe, La., vice-president of the United Carbon Co.; O. H. Simmonds of New York, vice-president of the Louisiana Gas & Fuel Co.; Henry L. Hollis of Chicago, president of the Palmer Corporation of Louisiana; R. W. Gallagher of Cleveland, president of the East Ohio Gas Co.; J. N. Canavan of Chicago, vice-president of the Utilities Power & Light Corporation; George W. Bacon of New York, chairman of the board of Ford, Bacon & Davis, Inc., and Louis E. Fischer of Chicago, president of the Illinois Terminal Railroad System.

LONE STAR EMPLOYEES ENTERTAIN DALLAS ADVERTISING LEAGUE

Wm. C. Grant, public relations director of the Lone Star Gas Company, was in charge of a program presented before the Dallas Advertising League at a recent weekly luncheon, which featured a motion picture showing the pipe line system of the Lone Star company. Work on the 20-inch pipe line, just completed, between Petrolia and Fort Worth was also shown.

The program included sleight-of-hand tricks by H. H. Daniel, songs by the Blue Blaze Quartet, including Travis Johnson, R. W. Ennis, W. R. Stephens and J. W. Hohen; a specialty dance by Walter Ford and Marie Shelton, and dances by the Lone Star Dancing Chorus, directed by Miss Shelton, and including Geraldine Bates, Frances Gaven, Mary Watts and Daisy Tippett.

All of those participating on the program, with one exception, were employees of the Lone Star company.

GENERAL UTILITIES CO. ASKS TO SERVE KANSAS TOWNS

General Utilities Company of Kansas, is seeking gas franchises in Osage City, Lyndon and other towns in Osage county, which it expects to serve from an extension joining the system of the company at Council Grove. Gas is at present served at Herington, Marion, Council Grove, White City and Wilsey, by the company, which plans also to serve gas in Florence, Peabody and Hillboro.

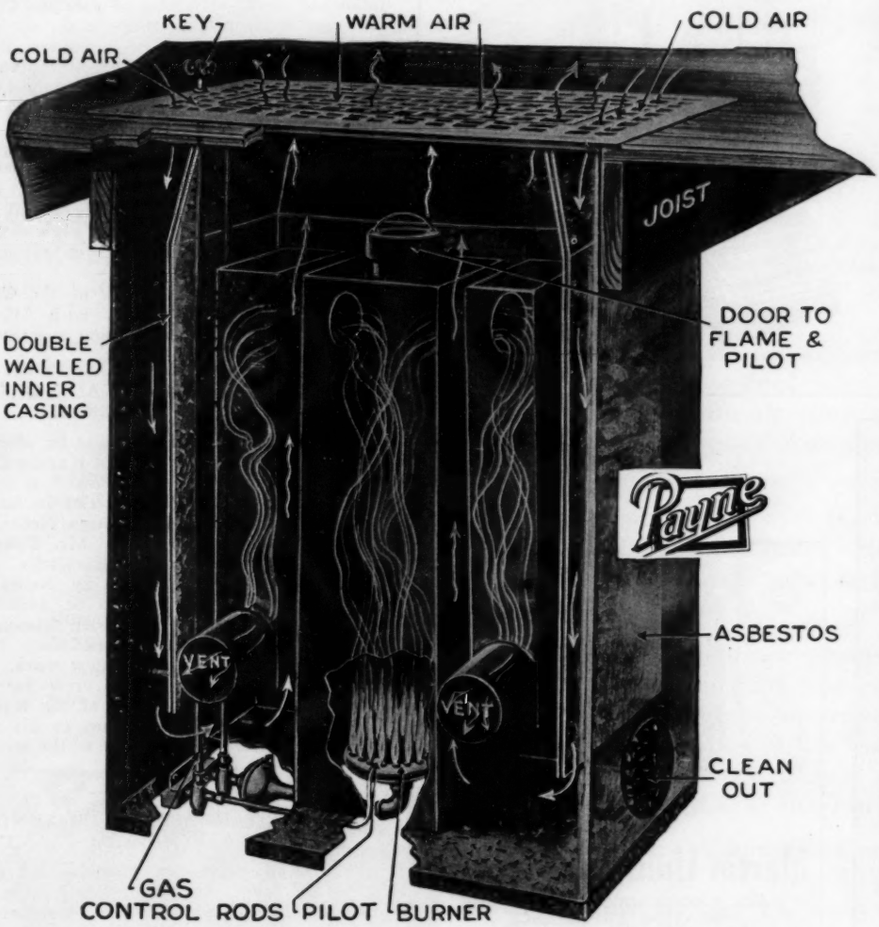
OKLA. NATURAL BUILDING LINE TO TISHOMINGO AND MADILL

Forty miles of 6-inch gas main is being constructed by the Oklahoma Natural Gas Corporation from a point on the main line at Ardmore to Tishomingo and Madill, Oklahoma, which towns will be served with gas.

Why Standardize on everything but the HEATING SYSTEM?

Architects find that the heating installation is more easily planned . . . and the owner assured better heating results . . . when the specifications read "Payne Gas Furnaces."

Heating Contractors spend less time on the job and have fewer "free service" calls to make after they have installed a Payne Gas Furnace.



Payne Gas Furnaces

give every owner maximum heating luxury and economy!

IN modest bungalows and spacious mansions, in offices, shops and stores, in schools, hospitals and all public buildings, in factories and work shops in hundreds of different cities throughout the country, Payne Gas Furnaces are coming more and more into popular use . . . more and more popular with owner, architect and contractor . . . more and more profitable to the heating specialist who has the Payne Furnace Franchise! Made by the world's largest exclusive gas furnace manufacturers over a period of more than 14 years, Payne Furnaces embody every refinement, every modern convenience, that the public is insisting upon today.

Just Out!
New Payne Catalog

Architects, contractors and heating engineers are invited to write for a copy of this new book which gives complete information on every Payne Gas Furnace type and size.

Payne Engineering Service

Architects, Building Contractors and Heating Engineers are invited to put their troublesome warm air heating problems up to the Payne Engineers. Send floor plans and full details of heating requirements. No matter how large or how small your installation may be, the Payne Furnace & Supply Co., Inc., is ready to cooperate with you.

Payne Heat

Factory Units
Unit Furnaces
Floor Furnaces
Central Furnaces
Pipeless Wall Units
Industrial Installations

Dealers—Write for Franchise!

In every important town and city there is a heating specialist who is the recognized *leader* in his community. We want that man to write us for details of the Payne Furnace Franchise. We have a definite plan of co-operation for exclusive Payne Furnace Dealers that takes you out of competition with ordinary propositions. Write today, giving full particulars regarding your territory.

Payne Furnace & Supply Co., Inc.

BEVERLY HILLS, CALIFORNIA

THERE IS A "PAYNE HEAT" SYSTEM FOR EVERY BUILDING AND ANY CLIMATE

There Is a Big Market

for Gas Conversion Burners

Hundreds of your customers are looking for economical equipment to convert their present boilers to automatic gas heaters.

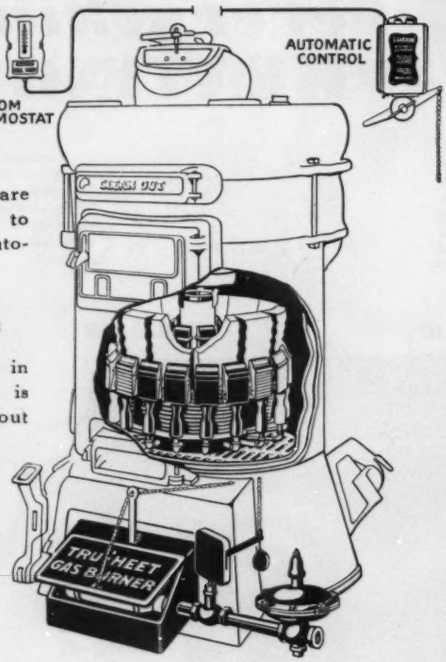
THE TRU-HEET Automatic Burner Unit

can be quickly and easily installed in all types of heating boilers. It is placed right on the grate bars without dismantling the furnace.

Write for attractive net prices

TROOP WATER HEATER COMPANY

2516-26 Jane Street
Pittsburgh, Pa.



ZINK BURNERS

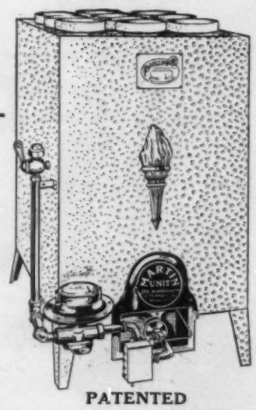
For All Purposes

Flame Burners
Short Flame Burners
Flameless Burners

Zink Burners help connect up industrial consumers by their low cost and simple installation, and keep them connected by their efficient and satisfactory performance.

JOHN ZINK CO.

Oklahoma Natural Gas Building,
Tulsa, Oklahoma



PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE
MADE IN FOUR SIZES
Electric, Thermostat or Manual Control
Approved by A. G. A. Laboratory and by the City of Los Angeles
Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.

1710 W. Washington St.
Los Angeles, California

Live Agents Wanted

TESTING LABORATORY A.G.A. APPROVED

GAS FUEL CHOSEN FOR HEATING GOODYEAR-ZEPPELIN SHOPS

THE Goodyear-Zeppelin factory shops at Akron, Ohio, first Zeppelin factory to be built in the United States, will be heated by gas, it has just been announced by the architects. Forty Clow Gasteam radiator units will be installed in the shops and offices, which will be under the same roof as the vast hangar.

The tremendous size of the factory and hangar would make it possible to house the airplane carriers "Saratoga" and "Lexington," together with the Washington Monument and the Statue of Liberty. Ten football games could be played at the same time under its roof. Its height equals that of a 22-story building.

Independent operation of each Gasteam radiator will permit heating any part of the shops and offices at any time.

The initial radiation to be installed is as follows: Nine 20-section, 4-column Clow Gasteam radiators 38 inches high, six 19-section, nine 18-section, one 17-section, thirteen 15-section, and two 13-section radiators. The entire radiation of approximately 4,000 square feet is vented.

Shops will be built along both sides of the structure, the space provided for them being about 40 feet wide by 640 feet long. The ceilings in the shops will be about 35 feet high. Eventually shops and offices will occupy all of this space, but at the present they will be confined to the east side of the building.

The Cleveland, Ohio, office of the Clow Gasteam Heating Company, with W. S. Logan manager, has the heating contract.

J. B. POWELL TO MANAGE GAS SERVICE CO. PROPERTIES

Announcement has been made by officials of the Gas Service Company of Kansas City, of the appointment of J. B. Powell as manager of the company's properties in northeastern Kansas and southwestern Nebraska. Towns which will be under Mr. Powell's management are Horton, Hiawatha and Sabetha, Kansas, and Falls City, Nebraska. Other towns are expected to be added to this group later. He has been associated with the Doherty organization since 1923, and prior to taking over his new work, was in charge of the inspection crew for the company, which worked out of the Kansas City office. Mr. Powell went to his new post early in December, prior to the serving of natural gas in those towns.

CONGRESS IS ASKED FOR FUNDS TO OPERATE HELIUM PLANT

The Appropriations Committee of Congress has asked that a sufficiently large appropiation be made for the Government's helium plant at Amarillo to insure its successful operation.

About one-half of the Government's helium supply is at present being produced by the Amarillo plant. The Kentucky Oxygen and Hydrogen Company which operates wells in Kansas, is the other source for the Government's helium supply.

H. E. MEYERS IS MANAGER OF PLEASANT HILL GAS CO.

H. E. Meyers of Tulsa, Oklahoma, has been appointed as manager of the Pleasant Hill, Misouri, Gas Company, with H. J. Fox, also of Tulsa, as office manager. Gas was expected to be turned on in the city the latter part of December.

QUICK INSTALLATIONS

BARBER *Automatic* JET GAS BURNERS

build business *NOW*

No. 3-R-17-R Barber Automatic Burner

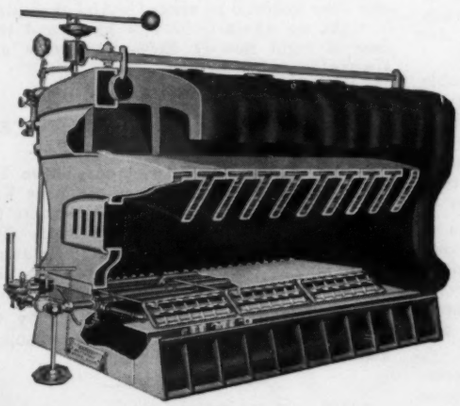
A COMPLETE AUTOMATIC CONVERSION GAS BURNER LINE—FOR 90% of your inquiries, at prices attractive to all.

Showing how quickly a Barber *Automatic* Jet Gas Burner can be installed through the opening of the clinker door without removing the grate bars

Barber Automatic Burners (as illustrated above) include the following items—all Completely Assembled:

Complete Burner Assembly, including Upper and Lower Baffles, Manifold, and Gas Shut-off Cocks to each Burner Unit.

By-pass Assembly for Pilot Supply.
Butterfly Draft Door Assembly.
Butterfly Draft Door Lift Assembly.
B-2210 Minneapolis Motor Gas Valve.
Minneapolis Room Thermostat.
Gas Pressure Regulator.



The Barber *Automatic* Jet Gas Burner is made for all sizes of round and rectangular furnaces and boilers

WITH all its advantages for boosting gas as the ideal house fuel, winter has one big drawback. It is the most difficult time to install a gas furnace or boiler—but Barber Automatics are easily and quickly installed.

Quick installations with Barber *Automatic* Jet Gas Burners build business *now*. No delay until spring before making the change. No waiting for new business—and satisfied customers.

Before your customer's house becomes cold from extinguishing his coal fire, you can have a Barber Automatic Burner in efficient operation. Simply clean out the coal fire and ashes in his furnace and install the burner equipment. Make a few necessary connections and adjustments. Light the burner.

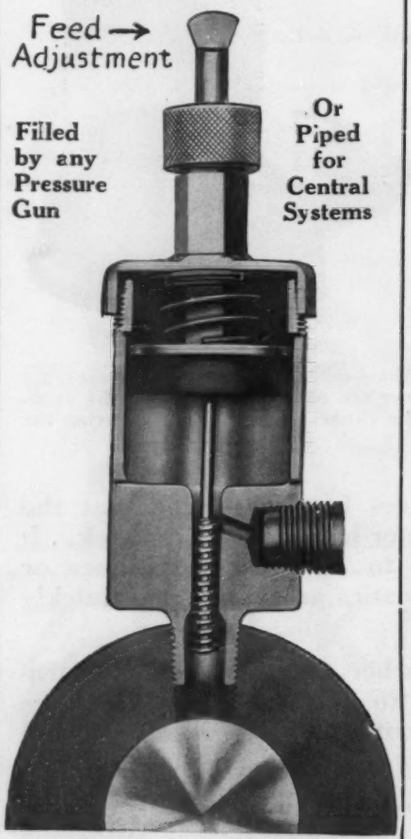
Such "Barber Automatic Conversions" show efficiencies ranging from 75 to 82 per cent. For you have the benefit of our 12 years of experience in this field. By sending us the *specification sheet* with the *trade name*, *number* and other *data* on the *furnace* or *boiler*, we are able to ship you the correct Barber Burner. It will fit like a suit of tailor-made clothes on the human form.

Details about conversions with Barber Automatic Jet Gas Burners are Contained in "The Ultimate Achievement in Simplified Home Heating." Write today for copy, also prices and trade discounts.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3102-04 Superior Avenue. Cleveland, Ohio

GUN-FIL

Positive Controlled Feed Lubricator



Constant lubrication is essential to cool, smooth running bearings, and to overcoming wear. Gun-FILS always feed just what each bearing requires. No waste of lubricant or sloppy condition at bearing.

Individual adjustment and interchangeable valves permit accurate feed control of lubricants from cup greases to heavy oils. GUN-FILS are suited to all sizes and types of bearings.

Let GUN-FILS solve your bearing problems. Give them a trial.

Distributed by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities Denver west.

Meeting the *Spot* Demand

(Continued from Page 31)

complish this result. One was to install an orifice plate at each well meter, the size being determined by the open flow capacity. By using each well the same number of hours each month, and keeping the rate of flow as shown by the meter chart approximately the same at all wells, approximately the same percentage of open flow is automatically delivered. It is necessary to keep a record of the number of hours each well is used, in order that the pressure man will know whether he is accomplishing the desired result. As it is not always possible to anticipate the demand from the field, it is necessary to use each well only a few hours at a time, in order to have the length of time for all wells balanced at the end of the month.

In fields where wells are not so easily controlled, it is necessary to operate each well at the most suitable rate of flow, and use it a sufficient number of hours to deliver the correct percentage of the open flow. The pressure man must know how much gas is passing from each well, and also keep a record of the time used. Close cooperation between the field and office is necessary in order to use this plan with success.

Open flow tests should be taken every three months on all wells, as any changes in open flow necessitate a change in operation of the wells affected.

All new wells should be put on the same schedule as the other wells in the same field, and the proper size orifice meter plate to give the desired amount must be decided upon before the well is turned into line. As soon as an open flow test on any well is received in the office, a check should be made to see if the open flow has changed, and if so, the operation of the well is changed accordingly.

In addition to the above task it is necessary to stay within the legally prescribed amount that can be taken from a gas well, which is 25 per cent of the open flow in Oklahoma and 50 per cent in Texas. This necessitates constant vigilance, especially in the winter when the demand is heavy. Wells with low volumes and high rock pressures are often difficult to control, due to freezing at control gates. This sometimes makes it necessary to use the well only a part of each day, in order not to exceed the allowed delivery.

The outlay of time, expense, and trouble necessary to prorate the amount taken from the well, according to open flow, is partially off-set by gaining the good will of well owners. When complaints about discrimination arise among them, you should be able to convince them that your policy will not allow it.

Compression: The compressor station is an important link in our chain of service. It is the stand-by tap on which we depend for quick changes in pressure. Compressor plants must be so organized and equipped as to be able to jump into full stride at any time to meet the peak demand.

Close cooperation and adherence to pressure orders are imperative. Engines must be kept in the pink of condition, and equal to a long hard run at top speed. And when pressure cut orders permit a shutdown, the idle unit should be groomed and conditioned and made ready for another peak load. If, due to engine failure, or break down, a pressure order cannot be met, the dispatcher should be promptly notified so that the deficit can be made up from another source.

Communication: Since the nature of our industry calls for operations over so large a territory, too much importance cannot be attached to communication; the un-interrupted transmission of orders, information, reports, etc., is vital to smooth operation. To this end there should be maintained an efficient and modernized telephone department. Trouble shooters should be so located and equipped as to be always available for prompt and speedy action. And they must be made to realize that the very sort of weather that is most apt to put a line out of commission is the kind that makes communication most necessary. And knowing this, they must be of the spirit that will not pause nor turn back until the trouble is cleared and communication re-established.

Transportation and Maintenance: The economic twins "transportation and maintenance" go hand-in-hand and are inseparable. They are the link between supply and demand. The aim of our whole scheme is un-interrupted service, and to accomplish this aim an elaborate organization to guard every foot of the main line should be maintained. At strategic points along the right af way permanent line camps should be established. with capable district foremen, in charge of prescribed territory, who will have linewalkers patrolling their beats regularly to guard against major defects; minute men that are ever available for emergency repairs. Regular repair crews should be constantly at work repairing the smaller leaks as located by specially equipped inspection crews who operate over the entire system as an independent department, so organized as to cover the several districts at regular stated intervals. There should be no let-up in this program of maintenance, as it is to be remembered that every cubic foot of gas saved by the prevention of leakage widens the margin between cost and return. Gas lost while being transported is a very definite loss. While gas in the field is worth just *nothing*, because it lacks utility. Its value is nil until transportation gives time-utility and place-utility—which means transporting it to a *place where it can be used, at a time when it is needed.* And that place is right up against the city gate, and that time is right now—today—tommorrow and always!

KAW VALLEY GAS AND SERVICE COMPANY GETS CHARTER

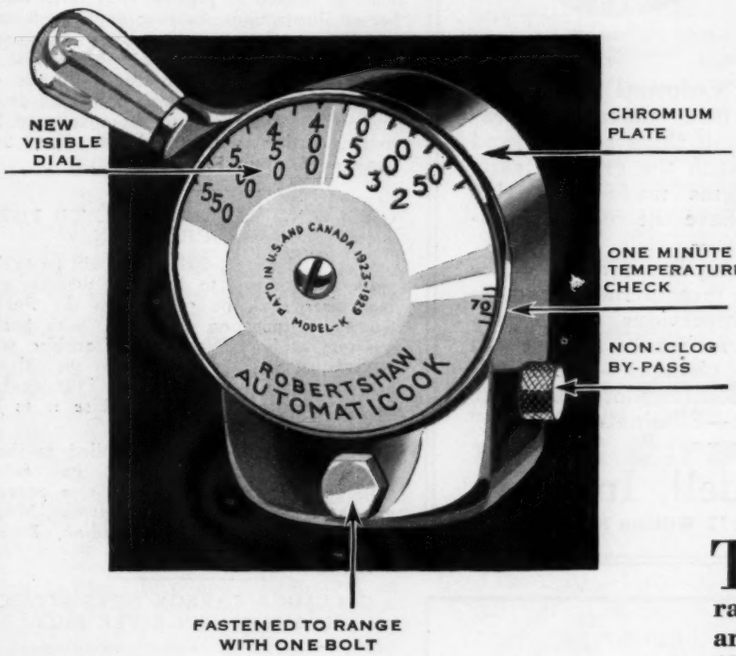
Kansas Public Service Commission on December 9 granted a charter to the Kaw Valley Gas and Service Co., which permits the company to operate within the state. The company is incorporated under Delaware laws, and is capitalized at $2,000,000. It's Kansas headquarters are in Herington.

A certificate has also been filed by the company asking for permission to supply gas to De Soto, Kansas.

LINE TO PACKING PLANT TO BE COMPLETED IN JANUARY

Work is expected to be completed in January on the 10-inch gas line being constructed by the St. Joseph Gas Company to supply gas to the Swift & Company packing plant of that Missouri city.

Here it is!
The New Improved
"K" Type
AutomatiCook
with 5
great Features



THE NEW "K" type AutomatiCook has five great features to make gas range selling easier for you. Here they are: (1) Handsome chromium plate finish. (2) Fully visible dial. (3) Fool-proof One-Minute Temperature Check. (4) Non-Clog by-pass. (5) Only *one* bolt attachment to range.

The new AutomatiCook is smaller, more handsome, more compact. It's better looking. There's a One-Minute Temperature Check. Every working part is accessible from outside of range.

More than 100 makes of the new ranges will be AutomatiCook equipped this year. Learn all about this greatly improved heat control now. Write for full descriptive literature . . . *today!* It might result in your selling more ranges this season.

ROBERTSHAW
AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

Re-Chrome Meter Leather

Re-Chrome Meter Diaphragm

BESSE, OSBORN & ODELL INC. COLONIAL BRAND BOSTON, U.S.A. RE-CHROME METER LEATHER

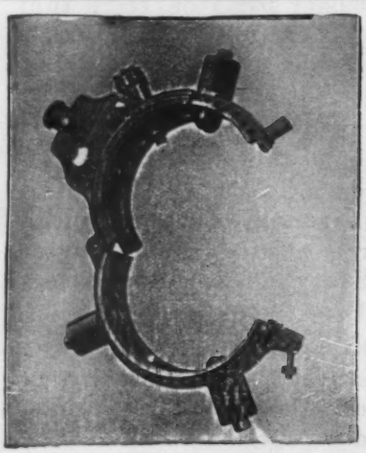
"Colonial" Brand

Made from choice New Zealand Lamb skins selected and tanned with the greatest care. Diaphragms made from this leather have the following advantages:—

Longer years service—More accurate measurement of gas—More impervious to water—Greater resistance to heat and climatic changes — Stronger fibre—Absorbs more oil—More Flexible—Eliminates "floppy" diaphragms.

Besse, Osborn & Odell, Inc.

51 South St., Boston 177 William St., New York



The STRICKLER

Ratchet Pipe Cutter

The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

W. W. STRICKLER & BROS.

1475 Oak Street Columbus, Ohio

California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.

308 East Eighth Street

Los Angeles

TRinity 0769

NORDSTROM CATALOG GIVES INFORMATION ON LUBRICANTS

A new catalog has just been issued by Merco Nordstrom Valve Company featuring Nordstrom valves in the various sizes with pressures ranging from normal to 1,500 lbs. A large number of mechanical detail drawings are also shown, indicating the construction of the various types of valves. Information is given on the various types of lubricants to be used in lubricated valves at different temperatures from 20 to 350° F., and specific information regarding the type of lubricant to use for different contents within the pipe line. A large number of illustrations showing application and installation of Nordstrom valves are shown in the catalog. Various tables of interest to the engineer are also included. Copies of the enlarged edition may be obtained from any of the offices of the company, or by communicating with the head office, 343 Sansome St., San Francisco.

GAGE AND FARGO, OKLA., TO VOTE ON FRANCHISE JAN. 7

Gage and Fargo, Oklahoma, will go to the polls on January 7 to determine whether gas franchises shall be granted to the Public Service Corporation of Texas, with headquarters at Fort Worth. A franchise was recently granted the company by the citizens of Gage, but due to a question of the legality of the election, a new franchise is to be voted on in January.

Gas is expected to be supplied to these towns from Pampa, Texas, gas fields, through a system which will also provide gas for Higgins, Perryton, Spearman, Magic City, Mobeetie, Miami, Canadian, Booker and Glazier in Texas.

COLUMBIA CARBON BUYS STOCK IN MISSISSIPPI RIVER FUEL

Press reports carry the announcement of the purchase, by the Columbia Carbon Company of 111,492 shares of the capital stock of the Mississippi River Fuel Corporation, for a cash consideration. The fuel corporation, which has recently completed its gas line from Louisiana to St. Louis, is owned jointly by the Standard Oil Company of New Jersey, the United Carbon Company, Electric Bond & Share Company and United Gas Company.

DOHERTY CO. BUYS STOCK IN FEDERAL LT. & TRACTION CO.

Press reports state that the Henry L. Doherty interests have acquired a substantial block of stock in the Federal Light and Traction Company, a holding company for gas and electric properties, as well as other utility properties in Arkansas, New Mexico, Washington State, Missouri, Colorado, Arizona, Wyoming and New Brunswick.

J. P. DAVIDSON WILL ATTEND ESTATE STOVE CO. SESSION

Jack P. Davidson, Pacific Coast manager for the Estate Stove Company, maker of the Heatrola and the Estate Gas Range, left California late in December to attend the company's annual convention, which will be held at Hamilton, Ohio, January 6.

PAYNE FURNACES RECEIVE O. K. OF CANADIAN GAS ASS'N.

Elroy Payne, general manager of the Payne Furnace Company, of Beverly Hills, California, announces that all furnace models made by the company have been approved by the Canadian Gas Association.

GAS FINDS NUMEROUS USES IN SILK PROCESSING

Approximately 1,500,000,000 cubic feet of gas is used in preparing, weaving and finishing about 500,000,000 yards of silk produced annually in the United States.

Gas is used in washing, steaming, drying, pressing, printing, sizing and singeing silk. In singeing, a sharp penetrating flame of a definitely known composition of air and gas is utilized to burn off the loose fibre, surface fuzz and short ends of threads. In "tentering" silk goods with gas, the cloth is steamed, stretched and dried at the same time.

Finishing plants operating large printing machinery use gas in setting the print paste and increasing the speed of the cloth during the operation. Another growing use for gas in the silk industry is the development of drying boxes and ageing towers utilizing gas for heating.

NEON SIGNS ADORN B. C. ELECTRIC RAILWAY COMPANY'S HOLDER

Outlined in Neon signs the word "Gas" in 20-foot letters now shines out nightly above the houses surrounding the 3,000,000 cubic foot gas holder of the B. C. Electric Railway Company at Vancouver, B. C. The wording "The Modern Fuel" is also in 20-foot letters, but this is illuminated by a battery of floodlights instead of Neon tubing. The wording is repeated three times on the cylinder and is thus seen from all sides.

DIXIE GAS & UTILITIES CO. ADDS TEXAS TOWNS TO SYSTEM

Dixie Gas & Utilities Company has added the Texas towns of Dayton, Crosby, Highlands, Lufkin, Liberty and Sour Lake to the company's system, according to an announcement by O. R. Seagraves, president of the company. Distribution in the Humble district is expected to give the system more than 2,000 new customers within the first year of operation.

LAS VEGAS PLANT CONSTRUCTION TO START IN DECEMBER

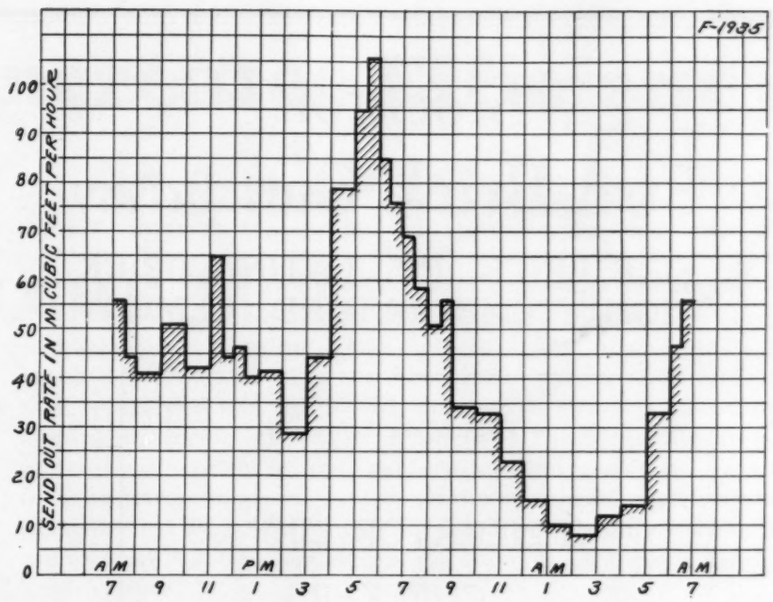
Construction of the new $175,000 gas plant a Las Vegas, Nevada, was scheduled to begin in December. Contract has been given to the Western Pipe and Steel Company for the scrubbers and all shell work, and four carloads of pipe for the distribution mains have been shipped from the factory. The project is expected to be complete in six months.

CHEYENNE JUNIOR HIGH NOW ON NATURAL SERVICE

Cheyenne Light, Fuel & Power Company of Cheyenne, Wyoming, is now supplying natural gas in the Cheyenne Junior High School. The installation will add approximately $7,000 annual revenue to the company's total by consuming about 20,328,000 cubic feet of gas.

REESE TO MANAGE FOR CITIES SERVICE AT WELLINGTON

Ivor G. Reese of the Kansas City office of the Cities Service Gas Company has been appointed manager of the Wellington, Kansas, Gas Company, succeeding C. D. Stewart. Mr. Reese has been with the Cities Service organization for 14 years and was formerly superintendent of the distribution stations for the company at Kansas City.



Connersville Meters maintain their accuracy of measurement through wide variations in flow.

The unit of measurement in a Connersville Meter is the displacement each revolution of the impellers. It is an unchanging volume, fixed by cast iron surfaces.

But, since the impellers are rotated by the flow of gas through the meter, the number of revolutions is controlled by the rate of flow.

Careful, frictionless construction enables Connersville Meters to instantly respond to variations in flow, speeding up to handle increased flow or slowing down for reduced volumes, without racing or lagging.

Because of these characteristics, assuring accurate registration of gas flow throughout a wide variation instead of at only a predetermined, pretested volume, you can depend on Connersville Meters.

A request addressed to our home office will bring you additional information.

The Connersville Blower Company

Michigan Ave. at 16th St.
Connersville, Indiana.

CONNERSVILLE
Blowers-Gas Pumps-Meters-Cycloidal Pumps

Stockton Fire Brick Company

FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for

GENERATOR LININGS
CHECKERS
BOILER SETTINGS

OFFICE:
Russ Building,
San Francisco

WORKS:
Stockton,
California

From
Coast to Coast
For Years
Gas Companies
Have Sold

DOUBLE DUTY
REG. U.S. PAT. OFF.

GAS RANGE & STOVE CLEANSER

REMOVES GREASE
PREVENTS RUST

Walmar Laboratory
Oshkosh, Wisconsin

WESTERN SALES
C. B. Babcock Co.,
San Francisco—Los Angeles

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

GAS FEATURES ARRANGED FOR WORLD POWER CONFERENCE

THE gas industry will have an important place in the World Power Conference in Berlin next June. Managing Director Alexander Forward of the American Gas Association is a member of the American Committee and a member of the executive committee on American papers for that meeting. The American gas industry will contribute a paper, "The Economic Cycle of Gaseous Fuel," which has been referred to the A. G. A. Technical Section, and the chairman, Mr. H. E. Bates, has suggested Walter C. Beckjord, as its author. A paper, "Extension of Gas Service and Progress of Rate Making" will be contributed by the A. G. A. Commercial Section and the Committee on Rate Structure. Another, "Legislation and Regulation," will be undertaken jointly by the American Gas Association and the National Electric Light Association, and W. J. Hagenah has been asked to prepare it. A paper on "Transmission and Storage of Gaseous Fuel," which H. C. Cooper has been invited to prepare with such assistance as he may desire, will also be a feature. As co-sponsor with the American Institute of Mining & Metallurgical Engineers, the A. G. A. will assist in preparing a paper, "The Coal Mining Industry as a Basis for Industrial Gas Supply." "Special Training Courses for Employees by Corporations and Associations and Correlation with General School System," will be prepared jointly by the American Gas Association and the National Electric Light Association, E. B. Luce of Baltimore having agreed to write the A. G. A. portion. The Statistical Departments of the American Gas Association and the National Electric Light Association will present a joint paper on "Methods of Collection of Power and Gas Statistics in the United States."

LACLEDE SUPPLIES GAS FOR GORDON BALLOON RACE

Laclede Gas Light Company, with headquarters in St. Louis, Missouri, supplied the gas used in the Gordon Bennett balloon race held recently in that city. Representatives from Belgium, France, Germany, Denmark, Argentina, the United States and other countries took part in the classic, with the United States winning the race in a balloon piloted by Wade T. Van Arman.

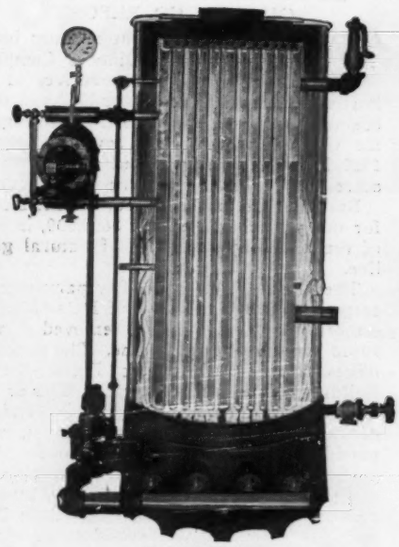
Approximately 1,000,000 cubic feet of gas were required for the nine participating balloons and the pilot balloon. The holder of the Laclede Gas Light Company at the Catlan Street plant was filled with coke oven gas of about .405 specific gravity which was used as the lifting power. Inflation of the balloons was under the supervision of a detachment of troops from Scott Field, Belleville, Illinois. This is the third time that the Laclede company has been called upon to supply gas for the race—an international event.

NORTHWEST CITIES GAS CO. AT EUGENE IN NEW OFFICE

Northwest Cities Gas Company has moved into new quarters at Eugene, Oregon, from the site which it has occupied since 1915. Fred W. Olsen is manager for the company at Eugene.

OKLAHOMA NATURAL TO BUY EASTLAND POOL OUTPUT

Oklahoma Natural Gas Company has contracted to purchase the gas output of the Eastland pool near Coleman. The daily open flow in the field is about 10,000,000 cubic feet.



Section View

10-H.P. Standard KANE Boiler
Equipped with Low Water Gas Cut-off and
Model 30 Automatic Gas Supply Control

Increases Efficiency

of Steam Processes!

KANE Gas-fired process steam generators are automatic, burning fuel only in proportion to the steam withdrawn . . . They are clean, both in operation and *purity* of steam delivered . . . They are compact, requiring small installation space, and may be placed close to the process operation, eliminating inefficient long *pipe lines* . . . Pressure is unvarying under load—which makes for accurate and consistent results from any steam process . . . Kane Boilers are available in suitable capacities up to 30 H. P. for any need—but multiple units of two or more Kane boilers are not uncommon. Write our nearest branch office.

Send for Bulletins and Price Sheet

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Boston—100 Arlington St.
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Buffalo—Walbridge Bldg.
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Manufacturers of Gas Boilers • • Water Heaters

Sprague Semi-Chrome Leather

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Now Used in All

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After

Five Years' Tests and Experiments

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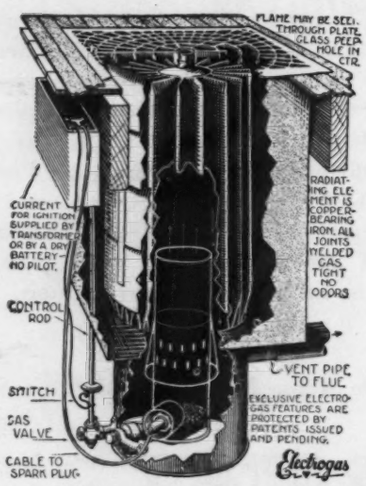
Electrogas

FLOOR FURNACES

The original electrically ignited furnace.

Hollow, streamlined fins offer unusual efficiency.

Fool-proof


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
CONTROL ROD
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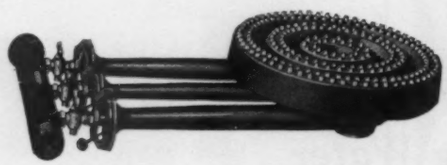
GAS VALVE
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
CABLE TO SPARK PLUG
Electrogas

available in four sizes:
20,000 BTU
25,000 „
30,000 „
40,000 „
also in Cabinet type.

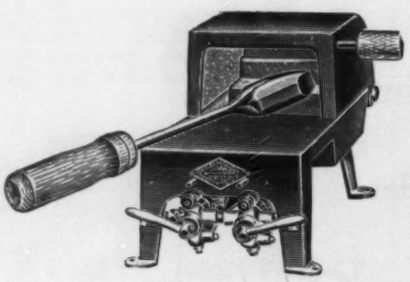
Electrogas, now in its tenth year, has won a reputation for efficiency, freedom from servicing, and all-around satisfaction which is second to none. It will pay you to handle this remarkable appliance.

ELECTROGAS FURNACE CO., Rialto Bldg., San Francisco



60 BCE Ring Burners With Venturi Tubes

Johnson Ring Burners are made for all standard or any special requirements. The 60BCE Ring Burners are outstandingly efficient due largely to the Improved Johnson Venturi Air Mixers and Tubes and heavy A.G.A. Type Valves equipped with Johnson Patented Direct Jet Regulators. Whatever may be your burner needs, write to us for expert advice relative to proper design and installation.



A Fast-Working Bench Furnace!

The Johnson No. 101 Bench Furnace is a speedy worker. Intense heat is immediately supplied by the two powerful Bunsen Burners—and no blower is needed! This popular Johnson product is proving itself indispensable in hundreds of shops. Write for catalog giving full details.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co., 135 Bluxome Street, San Francisco

288 PER CENT GAIN SHOWN IN GILMORE CO. REPORT

THE financial statement recently issued by the Forrest E. Gilmore Company, which is owned by executives of the Portland Gas and Coke Company, and their business associates, indicates that earnings of the Gilmore company for seven months of 1929 have been 288 per cent greater than a corresponding period for the year previous.

Based on the present trend, the net income for this year should exceed $600,000, in spite of the relatively low price of natural gasoline.

The Forrest E. Gilmore Company was incorporated under the laws of Delaware, December 31, 1925, and has enjoyed a very rapid growth since that time. The executive offices are located in the Public Service Building, Portland, Oregon. Chester A. Sheppard, a Portland attorney, is president of the company; Hilmar M. Papst, vice-president and general manager of the Portland Gas and Coke Company, is chairman of the board; E. L. Hall, general superintendent of the Portland Gas and Coke Company, is executive vice-president in charge of the operations of the company; and Seth L. Roberts, certified public accountant, is secretary and treasurer. Directors include the officers and A. J. Bingham, general contractor; Oscar J. Clossett, general insurance, and E. D. Ulrich, attorney, all of Portland.

The Mid-Continent headquarters of the company are located in the Wright Building, Tulsa, Oklahoma, with R. M. McCalley, formerly superintendent of distribution of the Portland Gas and Coke Company, as manager.

This company is engaged in the production of natural gasoline and its by-products, with plants located in the best known fields in Oklahoma and Texas.

In April of 1929 the Forrest E. Gilmore Company purchased from the Cushing Refining and Gasoline Company four gasoline plants located in Oklahoma. As a result of this purchase the number of plants owned by this company was increased to 13, and their daily gasoline production was brought up to a total of 88,000 gallons.

Due to the expansion which the company has made during the past year and to the operating earnings realized, it is now paying dividends at the rate of 16 per cent on the common stock, in addition to the regular 7 per cent dividends which have been paid on the preferred stock since the company was organized.

NATURAL GAS DEVELOPMENT IN UTAH INCLUDES SIX TOWNS

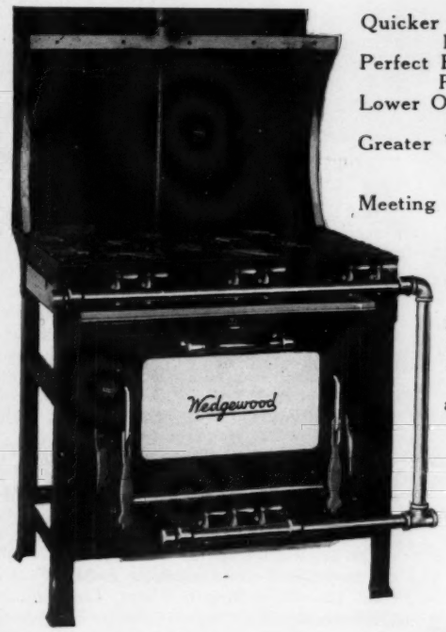
Franchise activities among the natural gas interests in Utah during the past month include the application for franchises in Morgan and Brigham City, by the Wasatch Gas Company. Natural gas is now being delivered in Murray, Midvale and Sandy, Utah, and mains are being laid to Garfield, site of the American Smelting and Refining Company's plant, and to other communities en route.

REVERBERATORY FURNACE IN EL PASO USING NATURAL

Natural gas has been turned on as fuel in a reverberatory smelting furnace at the American Smelting and Refining Company's plant at El Paso, Texas, and, according to engineers in charge of installation, this is the first time such a use has ever been made of the fuel. A heat of 2,750 degrees is necessary for the operation of a reverberatory furnace.

Wedgewood

Restaurant Gas Ranges



mean
Quicker Service,
Better Cooking,
Perfect Frying,
Perfect Baking,
Lower Operating
Cost and
Greater Working
Convenience.

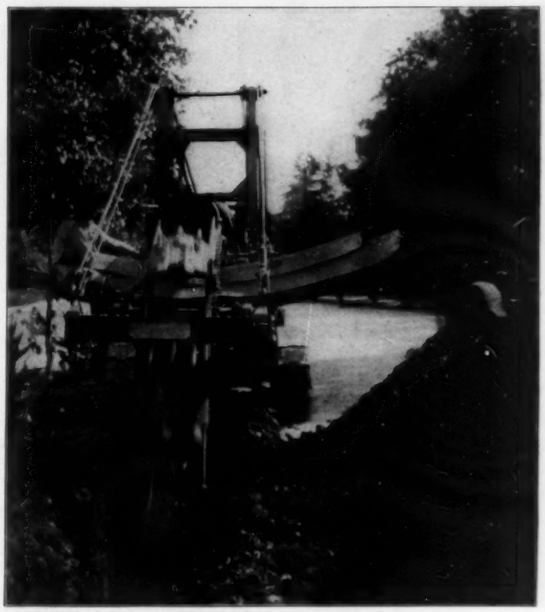
Meeting all demands of the trade for Short Order and other cooking.

Same high-grade construction that characterizes all Wedgewood workmanship.

SINGLE OR DOUBLE OVENS
WITH OR WITHOUT HIGH SHELF
WITH OVEN AND BROILER IF DESIRED
GRIDDLE MAY BE HAD FOR
ONE, TWO OR THREE SECTIONS
SEPARATE SINGLE OR DOUBLE
PASTRY AND ROASTING OVENS
SIX BURNER HOT PLATES IN
SKELETON FORM WITH OR WITHOUT
SINGLE KEY PLATE GRIDDLE

JAMES GRAHAM MFG. CO.
SINCE 1882
LARGEST STOVE MANUFACTURER IN THE WEST
WHATEVER THE STOVE REQUIREMENT THERE IS A WEDGEWOOD TO FIT THE NEED.
San Francisco Los Angeles Newark, Calif.

THE BABY DIGGER

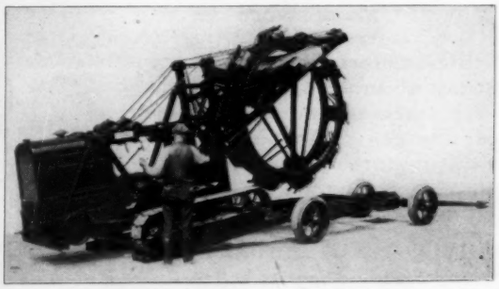


For Efficient Trench Digging

Useful in more than 90% of your trenching jobs, the Baby Digger, because of its compactness, power, and mobility will deliver for you maximum trench footage at minimum cost. The big per cent of your trench digging jobs must be done in closely confined areas.

Cleveland Baby Digger, the pioneer small trencher, is particularly adapted for this type of work. Precision built, of the finest materials, to advance design, the Baby Digger will perform the hardest digging jobs with ease, speed, and profit. It has abundant power, absolute dependability, maximum mobility, and unrivaled economy of operation.

More than 140 Cleveland Baby Diggers are now being used by over 70 gas companies efficiently and economically. Can you afford to miss the real saving these companies are securing? Write for information today.



Shows ease of loading Baby Digger on especially built trailer under own power.

The Cleveland Trencher Company
"Pioneers of the Small Trencher"
20100 St. Clair Ave. Cleveland, Ohio, U. S. A.
EDWARD R. BACON CO.
17th at Folsom Streets
San Francisco California

"JANUS"

JANUS, old Roman god of doors (gave us a good name for the current month) had two heads; could see fore and aft at the same time, peer into the future and scan the past, without wiggling a muscle.

We ordinary mortals can look just one way at a time. Looking back at 1929, most of us can congratulate ourselves; the year's voyage was a success. True, in October we had a brush with a submerged rock. But . . .

Both the Federal Government and private industry rushed to the rescue. Plans were laid for turning loose billions of dollars to stabilize business.

Looking forward, we feel assured that 1930 will be a banner year for oil and gas.

Now that the Captains of Industry have swung into line, keeping step to Uncle's Sam's **hep . . . hep . . . hep**, it won't be long until the ranks are all filled and General Prosperity takes command.

J. A. CAMPBELL CO.
Natural Gas Engineers
CONSULTING DESIGNING CONSTRUCTING
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LONG BEACH, CAL.
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Originators of Oil-Froth Absorbers

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Oil Meters

Positive Displacement Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

ALL SIZES ⅝" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 300 lbs. Higher pressures and special types to order.

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1048 Folsom Street, San Francisco 645 Santa Fe Avenue, Los Angeles

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Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

SITUATION WANTED—MALE

WANTED—Young single man with engineering and operating experience in the natural gas and petroleum industry to install pressure and temperature controlling instruments. Fine opportunities for promotion and travel throughout all districts where oil refineries are located or natural gas used. Write for appointment for interview, stating age, education, experience and salary desired. Address B-93, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

WANTED—Position as sales manager. Experienced in gas appliance merchandising. Have promoted, organized and managed merchandising department for two large gas utilities, and have had more than 10 years experience in the gas business. Will go anywhere. Address Box E-20, *Western Gas*, 124 West Fourth Street, Los Angeles, California.

EMPIRE GAS AND FUEL PLANS EXTENSIVE DEVELOPMENTS

Announcement has been made that a natural-gas development program is to be started early next spring by the Empire Gas and Fuel Company. The company plans to drill 35 wells in the proven areas of the Panhandle of Texas. This company, a subsidiary of the Cities Service Corporation, will supply gas for a 20-inch pipe line to transport the fuel to Chicago and a number of other northern and Midwest cities.

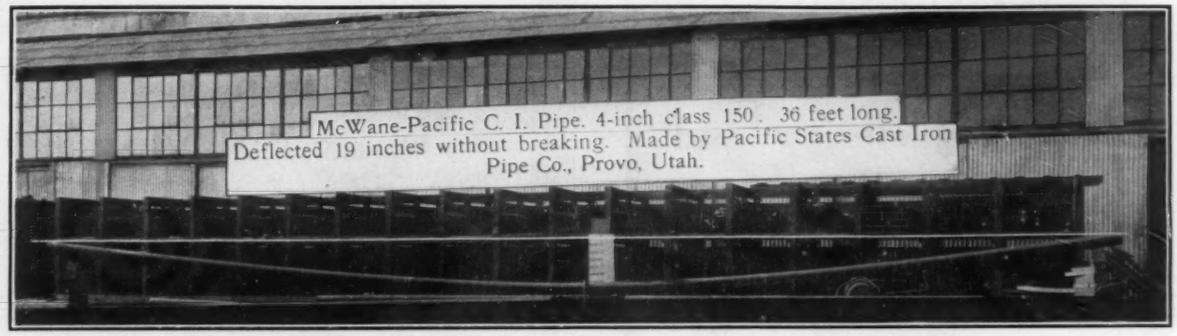
Twenty-seven producers, averaging about 21,000,000 cubic feet of gas daily, now are furnishing gas from the Burkburnett, Deahl, Fuqua and Lane leases in northern and northwestern Carson County. There are 21 wells on the Burnett ranch and two each on the other three leases. Two wells are being drilled on the Deahl estate.

According to press reports, tentative plans call for construction of a 20-inch gas main from the compressor station one mile east of Pampa through Nebraska to Chicago, Flint, Pontiac and Detroit, Michigan.

The Carson county producers are supplying gas through the 20-inch main from Pampa to Kansas City, Missouri, and Kansas towns. It is estimated that in excess of 750,000,000 cubic feet of gas daily will be furnished from the proposed wells.

ASPEN MOUNTAIN GAS CO. TAKES OVER NEW HOLDINGS

Announcement was made recently that the Rocky Mountain Gas Company has transferred its interests in southwestern Wyoming to the Aspen Mountain Gas Company. Both companies are subsidiary to the Western Public Service Company, holding organization for companies operating the Wyoming-Salt Lake natural gas transmission line. Towns affected by the transfer include Evanston, Green River and Lyman.


McWane-Pacific C. I. Pipe. 4-inch class 150. 36 feet long.
Deflected 19 inches without breaking. Made by Pacific States Cast Iron Pipe Co., Provo, Utah.

Now Can You Afford

to pass up CAST IRON gas pipe, in view of the strength and resilience shown above in this Western-made McWANE-PACIFIC Cast Iron Pipe?

Get *permanence* for your gas mains. Write us for list of important western users of McWane-Pacific Cast Iron gas pipe, for high and low pressures. Special joints for high pressures.

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Coddling—wrapping, coating, repairing—costs money. End it with Cast Iron Pipe. Save money when you buy—and every year thereafter. McWane-Pacific pipe comes as small as 1¼ inch, as large as 12 inch; in standard lengths; B. & S., plain ends, or McWane threaded joints.

Why Pacific Pipe Is Best

1. ***Sand cast.*** **Cuts, taps, ships, beautifully.**
2. ***29,000 lbs.*** **average tensile—2600 lbs. average transverse strength.**
3. ***Western-made.*** **Quick all-rail shipments.**
4. ***Modern weights*—more feet per ton.**

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The *H. H. Inhalator* for *Resuscitation*

Successfully Used by Gas Industry All Over the World!

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WESTERN GAS from time to time receives requests from manufacturers asking to be put in touch with capable men or organizations in the Southwest or on the Pacific Coast who are able to effectively market their products in the western gas industry.

We also receive requests for suggestions from men or selling organizations covering the Pacific Coast as well as the Mid-Continent section, who desire to extend their activities in this industry by taking on new products or additional lines.

If we can be of service to you in this way, get in touch with any one of our three offices—Los Angeles, 124 West Fourth Street; Dallas, 307 Thomas Bldg.; San Francisco, 447 Sutter Street.

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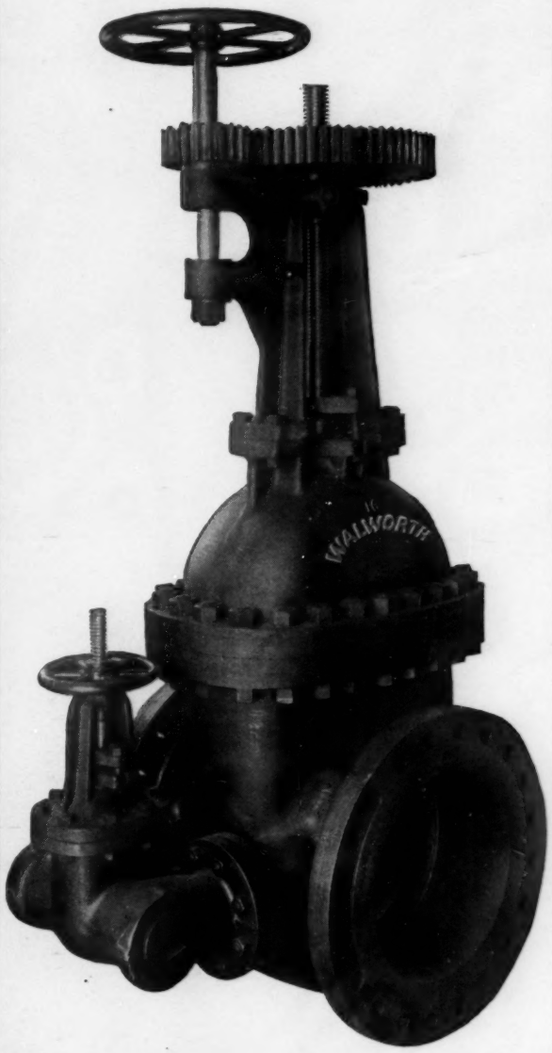

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FOR EVERY PRACTICAL PURPOSE

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for

GAS

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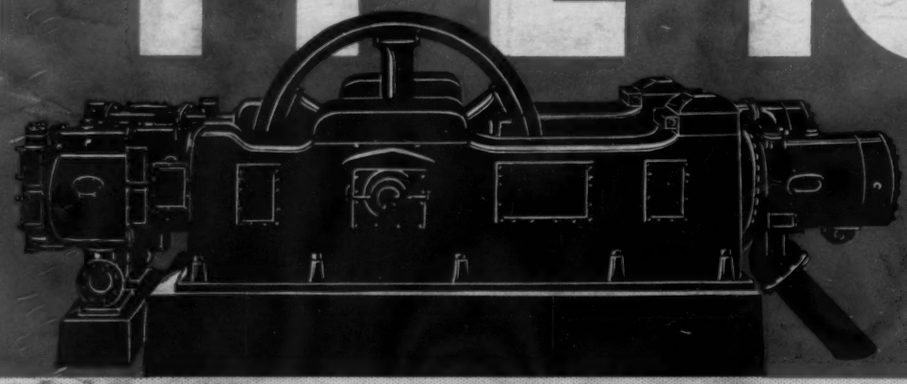

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5. Improved type piston and cylinder head.
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